FORESTRY ABSTRACTS

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FORESTRY ABSTRACTS

VOLUME 4 1943 NUMBER 3

FORESTS AND FORESTRY IN NORWAY

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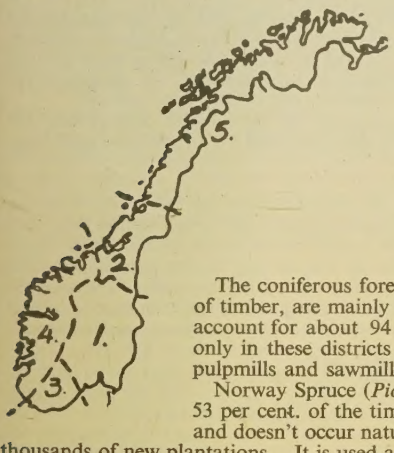
The Royal Norwegian Ministry of Agriculture

THE forests of Norway play a very important part in the economic life of the country and contribute much to the welfare of its people. Timber is still the principal building material used in the countryside and the main sources of fuel are the hardwoods (mostly Birch) and the thinnings from coniferous forests. On an average two-thirds of the annual cut is used within the country, the remainder being exported. Under present conditions when it is not possible to import cattle foods and large quantities of mineral fuels, forest products such as cellulose fodder, producer-gas fuel, and fuelwood are indeed of vital importance to the country.

FOREST AREA, COMPOSITION AND DISTRIBUTION.

The total land area of Norway is some 124,556 sq. miles. Of this, 67 per cent. is unproductive land, mainly mountainous, 8 per cent. is agricultural and pasture land, and the remainder—25 per cent.—is woodland. The distribution of the forest area, *per capita* area of conifers and the current annual increment, without bark, is shown in the following table.



Region	Forest area	Area of Conifers per capita	Annual increment	
			Conifers	Hardwoods
	1,000 *ha.*	*ha.*	1,000 *cu. m.*	1,000 *cu. m.*
1. Östlandet . . .	3,993	2·5	6,270	891
2. Tröndelag . . .	1,150	3·1	1,067	247
3. Sörlandet . . .	480	2·7	561	214
4. Vestlandet . . .	536	0·4	288	284
5. Nord-Norge . .	1,470	0·8	184	441
Norway . . .	7,629	1·9	8,370	2,077

The coniferous forests, which make up about 80 per cent. of the country's total volume of timber, are mainly in the Regions of Östlandet, Tröndelag and Sörlandet, which together account for about 94 per cent. of the country's total softwood increment. In fact, it is only in these districts that there is a surplus of timber for export and it is here that the pulpmills and sawmills are located.

Norway Spruce (*Picea abies*) is the most important forest tree in the country, contributing 53 per cent. of the timber volume. However, this species is seldom found on the west coast and doesn't occur naturally north of the Arctic circle, although it is the main species in thousands of new plantations. It is used as pulpwood and for all kinds of building purposes.

Scots Pine (*Pinus sylvestris*) is the only other important conifer found in Norway—it makes up 28 per cent. of the total volume. This species is widely distributed and is found both in pure stands and in mixture with Spruce. Some of the best Pine forests are found on poor sandy heath in the valley bottoms and also in the extreme north of the country—the latter are the most northerly Pine forests in the world. Scots Pine provides the best timber for sawmills and plywood factories and is used to a large extent for poles and sleepers. Second-grade Pine timber is used for boxboards, fuel, etc., and also for sulphate pulp in the making of such products as wrapping paper and cardboard. In contrast to the uneven-aged character of Spruce stands, Pine stands are usually even-aged.

Hardwoods, including Birch, Oak, Ash, Elm and Lime, are dominant in the narrow valleys along the west coast of Norway from Lindesnes north to Tröndelag. Here most of the woodlands are privately owned and, although the area per owner is small and the increment per acre low, they are of considerable importance to the local farmers, many of whom own small sawmills, which make possible a relatively high degree of utilization. Birch is by far the most important hardwood species. Extensive areas of pure Birch forest are found in the north of the country and this species also occurs in mixture with other hardwoods and with conifers. Pure stands of the hardy Mountain Birch (*Betula pubescens*) occur in the mountains above the conifers. A large proportion of these Birch woods are of little direct economic importance as they are usually inaccessible. However, they do afford protection to the lowlands and supply a certain quantity of fuelwood.

FOREST OWNERSHIP.

Thirty per cent. of the total productive forest area of Norway (7·6 million ha.) is owned in blocks of 100 ha. or less, about 35 per cent. in blocks of 100 to 1,000 ha., and 35 per cent. in blocks of over 1,000 ha. The productive forests are distributed as follows according to classes of ownership.

Class of forest according to ownership	*Percentage of total forest area*	
Forests in individual ownership	70·9	
Forests in joint ownership	0·9	
Company forests	8·4	
Private forests		80·2
State forests	10·2	
State commons (State forests used by rural communities)	3·0	
District commons (forests owned by districts)	2·4	
Parish forests	3·0	
Public forests		18·6
Opplysningsvesenets Fond (formerly Church forests)		1·0
Forests owned by public institutions		0·2
		100·0

About two-thirds of the forest area is owned by farmers, a fact that has a marked influence on management and labour problems, as the men who work on the farms in summer-time find employment in the woods during the winter. In Norway, as in most other countries, it is the small farm woodlot that gives the lowest yield. The main reason for this is the low volume per acre of standing timber. Furthermore, the ground is usually heavily grazed—a condition that is never favourable to intensive forestry. Plans are now being developed for the removal of grazing from forest land, the State to subsidize the clearance and joint cultivation of other land for pasture.

The ownership of land by two or more individual farmers has generally led to inefficient utilization. For example, on the west coast of Norway there are about 1 million acres of barren heathland which could and should be planted with trees, but the work is hindered to a great extent by the age-old type of joint ownership. Forests belonging to private companies have been under expert management for a long time and as a result they are usually well looked after.

Most of the State forests are in the north of the country, in the mountain regions, and, in consequence, are of value mainly for protection purposes and give a low yield of timber. The State commons and District commons are, as a rule, under good management. In recent years there has been a trend towards establishing more District commons in order to allow small farmers to get enough timber to meet their own requirements for repairs, tools, fuel, etc. The yield from District commons in excess of the farmers' needs is sold on the open market.

Opplysningsvesenets Fonds Skoger (formerly Church forests) are managed by State forest officers and are among the most productive forests in Norway. Any profits made from them are used for educational purposes.

FOREST POLICY.

There has been a marked improvement in the treatment of forests in Norway since the last war. For one thing, as the pulpmills year by year increased their production, a point was reached when a reasonable price was obtained for the smaller-sized logs, thus enabling the owners to treat the woods of the young as well as the older age classes according to the best silvicultural principles. Furthermore, an intense and honest propaganda and education campaign by the Norwegian Forest Society (Det norske Skogselskap), based on the work of the research stations, has had a decisive and favourable influence on the development of Norwegian forestry. It has succeeded

County	*Census years*	*Improvement during period shown*				*Volume Norway Spruce*
		Increase in current annual increment		*Increase in total volume*		
		Norway Spruce	*All species*	*Norway Spruce*	*All species*	
		per cent.	*per cent.*	*per cent.*	*per cent.*	*per cent. of total*
Östfold	1919 and 1937	60	44	48	32	55
Akershus	1920 and 1939	23	19	15	12	73
Hedmark (in part)	1920 and 1938	27	20	11	10	68

in arousing the interest of the farmers and of the whole people. In the primary schools all over the country, children spend a few days each spring planting trees, an event which leaves with them a lasting impression. Many of the youth organizations have their own plantations, and some parishes obtain State loans to purchase land for afforestation. In recent years some silvicultural work has been done by soldiers in special 'forest recruit courses'.

As a climax to this campaign, a law was passed in 1932 whereby all the woodlands of the country were put under professional control. This law fixes a 2-per-cent. duty on all forest products sold (2 per cent. on value of timber when cut and hauled to river bank), and, while the money thus obtained is retained for the individual who sold the timber, it must in due time be used by him to improve his forest. The law allows the owner to work his forest as he likes, provided the method he uses is technically sound and the results are satisfactory. For this

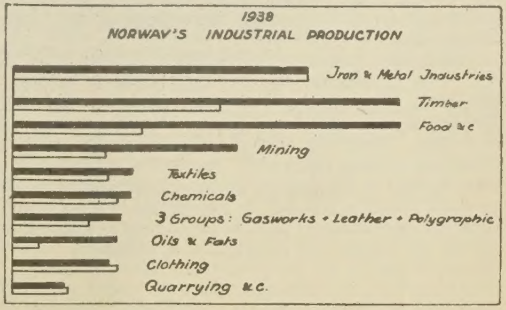
reason, and also because of the efforts of the forest officers administering the law, it has received the general backing of forest owners.

Improved practices have not been in operation long enough to show the maximum results that may be obtained. Nevertheless, there are many signs that forest conditions have greatly improved. A census of woodlands now being revised and already completed for the counties of Akershus, Östfold and part of Hedmark shows a remarkable increase in the annual increment and the standing volume during the last 20 years.

While favourable climatic conditions during the period in question, differences in the census methods used, and cumulative errors in the work done, may have been responsible in some degree for these results, it is believed that the factors mainly responsible for the improvement shown are:—(1) the restriction of the annual cut to an amount less than the increment, thus adding each year to the forest capital, and (2) improved silvicultural treatment and drainage of swamps.

WOOD INDUSTRIES.

Norway has certain natural conditions that favour the development of a wood-products industry. Many rivers provide cheap transportation of wood to the mills; waterfalls give any amount of electric power; and good harbours are open all the year for the merchant fleet to carry the products all over the world. Forest industries have accounted for from 48 to 24 per cent. of the total value of the country's exports and they were the leading export industries until 1937 when they were surpassed by the 'Iron & Metal' group. The following graph shows the relation of the timber industry—in value of products and number of persons employed—to the other principal industries of the country.



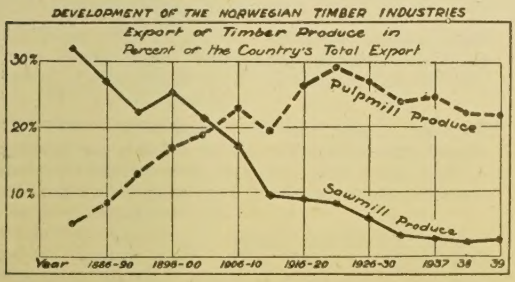
The 'Iron & Metal' group, which employs the largest number of men—43,309—is used as the standard for comparison. The total value of production for this unit is 316·6 million Kroner (Exchange 1939, Kroner 19.90 = £1). It should be noted that much of the work bearing on forest production is not represented in this graph—as that concerned with silviculture, cutting, extraction, measurement, floating, etc., as well as the operation of some 4,000 sawmills too small to be included, and practically all of the 'domestic' forest industry.

Extraction and transport of timber.

Most of the timber is drawn out of the woods during the winter and piled on the river banks or on the ice. Horses are generally used for this purpose though in recent years tractors and trucks have also been used, mainly in the southeast. In the spring the timber is floated down the rivers to the mills on the coast, practically all rivers in the forest districts being used for this purpose. Between 2·2 and 5·6 million cu.m. of timber (20–30 million logs) are transported in this way each year. In recent years some Spruce has been cut in the spring and early summer when bark removal is easiest, and the timber is then transported by truck and railroad direct to the pulpmill.

The sawmill industry.

Timber was sent abroad from Norway more than a thousand years ago and the export of sawn material began as early as the twelfth century. The sawmills reached their maximum output around 1875 when some 2·3 million cu.m. of timber were exported from the country. Since then and up to the beginning of the present war the amount of the annual cut taken by the sawmills has decreased as the pulpmills have been able to pay a considerably higher price for the timber. Sweden, Finland and Russia had large areas of virgin forests giving excellent timber to their rapidly growing sawmill industries, and it was difficult for Norway to compete either in quality or in price. In recent years, therefore, production of saw timber has been mainly for domestic consumption, only 15 per cent. of the output being exported.



Before the present war there were from 100 to 150 large sawmills in the country and between 4,000 and 4,500 small mills, which are either stationary or portable. The latter are used to supply the requirements of the farmers, and to some extent the local market.

The pulp industry.

The first pulpmill was established in Norway in 1863. With an ever-increasing world demand for paper and other cellulose products, the industry, as already noted, has been able to pay a relatively high price for timber, and in consequence most of the timber not required for home consumption has gone to the pulpmills for export as pulp or a pulp product. In normal years these mills use about 4 million cu.m. of timber. The graph given above shows clearly how (with home consumption fairly constant) the pulp industry has expanded at the expense of the sawmill industry.

War-time uses of timber.

During the present war the uses for timber have changed considerably. A high percentage of the pulpwood is converted into fodder for cattle and horses. Fuel for producer-gas generators in the form of charcoal or small pieces of wood ('knott') takes more than 10 per cent. of the total cut. The amount of saw timber is more than twice that in peace-time, the material being used mainly for military purposes. About 6 million cu.m. of wood is used for fuel—about three times that used in normal years and nearly half the total annual yield.

FUTURE DEVELOPMENT.

In recent years the capacity of Norwegian forest industries has surpassed the annual increment of the forests—pulpwood has been imported from countries as far distant as Canada in order to satisfy the increasing demand for raw material. It is therefore of the utmost importance that the forest yield should be increased towards the considerable maximum as quickly as possible. In this direction progress has been made during the past few years by the Ministry of Agriculture, which, since 1935, has been—and is—under the able leadership of Mr. Hans Ystgaard. During these years more and more private forests have been placed under technical supervision and many forest officers have been appointed to look after this work. Furthermore, in 1938 a bill was passed in the Norwegian Parliament to secure money for a long-term reforestation plan (skogreisingsplan), which will be of far-reaching importance in the years to come. It aims at increasing the annual increment by 50 per cent.

Prominent foresters in Norway believe that there are possibilities of a 100-per-cent. increase in the value production of Norwegian forestry through more intensive afforestation and improved management practices. Though this will mean increased expenditure of money that will give little or no return during the first years, it is considered by the Ministry of Agriculture that this is fully justified in the interests of national economy. Plans are now in preparation for extensive forestation immediately after the war. The principal objectives of these plans are:—to plant or sow all ground that will bear good timber but where satisfactory natural regeneration is impossible; to afforest the slopes of the coastal districts at present covered by heather or scrub; to drain swampy ground; to use species best suited to the site; to treat existing growing stock according to best silvicultural principles; and always to bear in mind other forms of land utilization so as to ensure its most effective use for the benefit of the people as a whole.

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ABSTRACT SECTION

NOTE.—A capital letter in square brackets following the reference denotes the language in which the paper is written. A small letter denotes a summary in another or the same language, e.g. [G.e.]—German, with English summary. English [E.] is only indicated for papers published in journals usually written in foreign languages.

The term "billion" used in papers originating in North America means a thousand million.

0. GENERAL FORESTRY

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05.3 (54.2). SABHARWAL, L. R. **Annual progress report on forest administration in the Province of Bihar for the year 1939–40.** Supt., Govt. Printing, Bihar. 1941. pp. iii + 50 + 3.

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Notes on work undertaken at the Forest Research Institute, Dehra Dun, in connexion with war-time problems of timber supply and utilization. [Cf. *For. Abs.* 3 (279).]

07.5. **The Harvard forest models.** Harvard College, Petersham, Mass. 1941. pp. 48.

The Harvard Forest models described in this publication are arranged in three series:—(1) a series of seven models portraying the history of the central New England forests; (2) ten models illustrating the silvicultural practices developed at the Harvard Forest for application to local forest conditions; (3) six models illustrating various conditions and functions related to modern forestry, including wildlife management, soil erosion, forest fire, etc.

09.4. *Forest Statistics*

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09.4 (71) : 33.12. CANADA. **The wood-turning industry, 1940.** Dominion Bureau of Statistics, Ottawa. 1942. pp. 2. [E.F.]

09.4 (71) : 33.12 : 33.4 : 12.26–8. CANADA. **Preliminary report on the hardwood flooring industry in Canada, 1940.** Dominion Bureau of Statistics, Ottawa. 1941. pp. 9. [E.F.]

09.4 (71) : 33.6. CANADA. **The box, basket and crate industry in Canada, 1940.** Dominion Bureau of Statistics, Ottawa. 1942. pp. 4. [E.F.]

09.4 (71) : 33.8. CANADA. **The boatbuilding industry, 1940.** Dominion Bureau of Statistics, Ottawa. 1942. pp. 3. [E.F.]

09.4 (71) : 38.2. CANADA. **Report on the construction industry in Canada, 1940.** Dominion Bureau of Statistics, Ottawa. 1942. pp. 68.

09.4 : 33.32 : 98.1–3 (43.1–5) : 34.6. KRAUSZ, H. Entwicklung und Möglichkeiten des deutschen Holzfaserplatten-Marktes. **[Development and possibilities of the German market for wood-fibre boards.]** *Holz* 5, 1942 (73–8). [G.] P.R.

Imports in 1940 were valued at 1,115,000 RM, and consisted mainly of soft insulation boards (Dämmplatten). Production has increased rapidly in recent years: in 1941 it amounted to 24,350 metric tons of soft boards and 72,785 metric tons of hard boards, the latter being used mainly as substitutes for plywood. Wood consumption of the industry in 1941 is estimated at 420,000 cu. m. stacked volume, including 290,000 stacked cu. m. of waste wood. The future supply of raw material appears to be assured and an increase in production is envisaged, notably in regard to hard boards.

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Forest areas (Table 1) and production of, and demand for, timber (Table 2) are summarized for the major geographical regions. The increment figures are based on minimum estimates. Except for Europe they refer to well-stocked forests only, savannas and inaccessible forests being disregarded.

09.7. *Monographs of Individual Forest Regions*

09.7 (44) : 60.31 : 12.25 : 07.8. DENGLER, A. Forstliche Studienreise nach Südwestfrankreich. **[A forest study tour to southwest France.]** *Z. Weltforstwirt.* 9, 1941–42 (255–293). [G.e.f.]

TABLE 1. FOREST AREAS

Geographical regions	*Area in million ha.*	*Population in millions*	*Forest areas*			*Remarks*
			In million ha.	*In per cent. of land area*	*Per capita in ha.*	
Eurasia	2,310	220	515	22·3	2·34	Well-stocked forest areas only, including Rumania, Scandinavia. Forest areas are considerably higher according to other data
European regions	*645*	*175*	*205*	*31·8*	*1·11*	
Central Europe	100	125	25	25·0	0·20	Including Denmark
Western Europe	93	110	13	14·0	0·12	
Mediterranean region	800	157	45	5·6	0·29	Including North Africa
Africa	2,455	120	350	14·3	2·92	Excluding North Africa
North America	1,890	140	635	33·6	4·54	
U.S.A.	*770*	*130*	*250*	*32·9*	*1·92*	Excluding foreign possessions
Canada, Alaska, Newfoundland	*1,120*	*10*	*385*	*34·4*	*38·50*	
South America	2,150	130	800[1]	37·2	6·15	Including Central America and West Indies
Near East	940	390	200	21·3	0·51	Including British India
Far East	1,380	610	150	10·9	0·25	
Japan	*70*	*100*	*45*	*64·3*	*0·45*	
China	*690*	*430*	*50*[2]	*7·2*	*0·12*	
Oceania	1,110	90	240	21·6	2·67	Including Malayan Peninsula
Australia	*795*	*10*	*40*	*5·0*	*4·00*	Including New Zealand
Other regions of Oceania	*315*	*80*	*200*	*63·5*	*25·00*	
Total	13,228	2,092	2,973	—	—	

[1] Forest area statistics reduced by 100 million ha. [2] 90 million ha. according to other sources.

Notes on the *Pinus maritima* forests in the Landes, and their management.

09.7 (492) : 92 : 09.4 : 96.5 : 91.1 : 07.1 : 98.1. STEIJN, J. A. VAN. Quelques données sur les conditions forestières du Pays-Bas. **[Some data on forestry conditions in Holland.]** *J. for. suisse* 93, 1942 (150–1, 186–8). [F.]

Notes on forest legislation, forestry statistics, afforestation of waste land, protection of nature, forestry education, and the timber supply position.

09.7 (54.8) : 94.1 : 60.31.1 : 97.2. BANERJEE, RAI SAHIB A. L. **A note on the Parlakimidi forest division.** *Indian For.* 68, 1942 (66–74).

A short account is given of the position, soil, rainfall and population of the Parlakimidi forest division. Conservation of forests is made difficult by repeated cutting and burning by the Savaras for toila cultivation and by the smuggling of fuel and timber by the neighbouring villagers. The main revenue comes from minor forest produce, especially Tamarind.

thought that, in view of the competing demands of other branches of colonial development, this figure could hardly be increased beyond 120,000. Local pressure of population has usually led to forest destruction. Thus in the border regions between the great Guinean forest belt and the grasslands the forest has been pushed southward yielding its place to savanna.

TABLE 2. INCREMENT AND DEMAND

Geographical regions (as defined in Table 1)	*Increment*		*Demand*		
	Per ha. in solid cu. m.	*Total in million solid cu. m.*	*Per capita in solid cu. m.*	*Total in million solid cu. m.*	*Surplus (+) or deficit (−)*
Eurasia	1·0	450–650	1·2	265	*approx.* +300
European regions	*1·3*	*265*	*1·2*	*210*	*+55*
Central Europe	3·0–3·5	75–90	1·0	125	−40
Western Europe	2·0	30	0·9	100	−70
Mediterranean region	3·0–4·0	135–180	0·8–0·9	140	±0[1]
Africa	2·0[2]	350	0·5	60	+290
North America	1·0	420	1·65	230	+100
U.S.A.	*1·25*	*250*	*1·5*	*200*	*±0*[3]
Canada, Alaska, Newfoundland	*0·7*	*170*	*3·0*	*30*	*+100*[4]
South America	3·0	1,200	1·2–2·0	130–260	+1,000
Near East	1·0	200	0·5	200	±0
Far East	1·7	250	0·4	230	+20
Japan	*2·0–2·5*	*100*	*1·0*	*100*	*±0*
China	*0·4*	*30–40*	*0·2*	*90*	*−60*
Oceania	4·0	800	0·3	30	+760
Australia	*1·0*	*30*	*1·0*	*10*	*+20*
Other regions of Oceania	*4·5*	*760*	*0·25*	*20*	*+740*

[1] There is, however, a deficit in industrial timber (Nutzholz) of 40 million solid cu. m.
[2] Estimate according to Heske, which covers rain forest and monsoon forest only.
[3] After deduction of 50 million solid cu. m. destroyed by fire and other agencies.
[4] After deduction of 35 [40?] million solid cu. m. destroyed by fire and other agencies.

09.7 (6) : 60 : 97 : 82. HESKE, F. Wald und Bevölkerung in Afrika. **[Forests and population in Africa.]** *Z. Weltforstwirt.* 9, 1941–42 (143–58). [G.e.f.] [Reichsinstitut für ausländische und koloniale Forstwirtschaft.]

Includes a map, scale 1:15 million, showing the distribution of the population and the location of the major forest regions of Africa. Taken as a whole, the African Continent has a low density of population. The labour available for forestry work is limited. It is estimated that before the present war the most important forest countries—Gabon, Cameroons, Nigeria, Gold Coast, and Ivory Coast—employed between them 28,000–30,000 labourers on forestry work. It is

09.7 (71.1) : 3 : 4 : 98.1 : 22.14.2 : 23.3. WRIGHT, T. G. **Forestry problems in British Columbia.** *B.C. Lumberm.* 26 (8), 1942 (25–6, 36, 38).

This conference paper discusses problems relating to the protection, exploitation, utilization and replacement of the forest resources of British Columbia.

09.7 (79.3) : 12.19.2 : 12.19.3 : 64 : 65. WILSON, R. C. **Vegetation types and forest conditions of Douglas, Ormsby and southwestern Washoe Counties, Nevada.** *For. Surv. Release Calif. For. & Range Exp. Sta.* No. 2, 1941. pp. 61 + plates.

1. FUNDAMENTAL NATURAL LAWS OF THE FOREST

11.1. *Atmosphere*

11.12. Pressure and Movement of Air

11.12 : 12.19.22 : 12.14.6. WOELFLE, M. Windverhältnisse im Walde. III. Einfluss von Unter- und Zwischenstand auf die Windverhältnisse über der Bestandsrandzone. IV. Die Luftbewegung in und über dem Kronenraum eines älteren Bestandes. **[Wind conditions in the forest. III. Influence of lower and intermediate growth on wind conditions at the marginal zone of the stand. IV. The movement of air in and above the crowns of a fairly old stand.]** *Forstwiss. Cbl.* 64, 1942 (169–82). [G.]

Report on two investigations on wind conditions in the marginal zone of a fairly dense, almost pure Spruce stand about 55 years old and 17 m. high. Dense lower and intermediate growth reduced the wind velocity in the proximity of the soil by $\frac{1}{5}$–$\frac{1}{3}$ as compared with a similar stand (previously investigated) having a single storey. It is thought that the decrease in wind velocity due to the lower and intermediate growth is even more pronounced in the interior of the stand. Considerable "unrest" in the movement of the air was observed in and above the crown layer in the marginal zone of the stand, with great fluctuations in the velocity and direction of the wind.

11.14. Precipitations. Evaporation. Humidity

11.14.3 : 11.21 : 91.3. WARREN, W. D. M. **The proof of climatic change.** *Indian For.* 68, 1942 (17–23 + gph.).

Stress is laid on the extreme difficulty of obtaining proof of climatic change, especially of change in

rainfall, and suggestions are made for the recording of rainfall data. A method is indicated whereby the graph showing annual fluctuations can be smoothed out, thus facilitating the detection of rainfall changes.

11.4. *Soil*

11.41. Soil Physics

11.41.2 : 12.11.23 : 12.14.5 : 12.26–8. COILE, T. S., and GAISER, R. N. **Effect of soil aeration on the foliation of Black Locust seedlings.** *J. For.* 40, 1942 (660–1). [School of Forestry, Duke University.]

Experiments were undertaken to determine the effect of aerating the A and B horizons of three Piedmont soils on the foliation of Black Locust seedlings. The B horizon of two of the soils was plastic clay while that of the third was a red, friable clay. Aerated soils gave a significantly higher foliation and a more rapid production of leaflets.

11.41.5–6. ALDERFER, R. B., and MERKLE, F. G. **Structural stability and permeability of native forest soils compared with cultivated areas of the same soil type.** *Proc. Soil Sci. Soc. Amer. 1941* 6, 1942 (98–103). H.S.B.

11.42. Soil Chemistry

11.42.1 : 11.41.8. AUTEN, J. T. **Some base-exchange relations of old-growth forest soil profiles in the Central States.** *Abstr.* in *Proc. Soil Sci. Soc. Amer. 1941* 6, 1942 (404). [Central States Forest Exp. Sta.] H.S.B.

Seventeen old-growth forest and matched field soil profiles were examined for base-exchangeable hydrogen, calcium, and magnesium. With few exceptions larger quantities of exchangeable hydrogen were found in all profiles of woods soil than in those of field soil, and larger quantities of replaceable calcium and magnesium were found in the A_1 soil horizon of woods soil than in the A_p (ploughed) horizon of field soil, and smaller quantities of the same elements in the A_2 horizon of woods soil than in the A_2 horizon of field soil. The quantity of replaceable calcium and magnesium was greater in litter from Oak, Oak/Hickory, Elm/Ash/Maple, and mixed mesophytic forests than from Beech/Maple and mixed Pine/hardwood forests.

Forest litter high in calcium and magnesium was found in forests on soil derived from lime-rich parent material. High calcium content of litter and A_1 soil was closely related with occurrence of those tree species which thrive on moist sites. The conclusion is drawn that the over-all limiting factor in forest type distribution is moisture, bases having a secondary and rarely decisive influence. In the equilibrium old-growth hardwood forest the quantity of calcium drawn from mineral soil is exceedingly low, probably never more than 4 lb. per acre per year. The high calcium content of the A_1 soil horizon of certain hardwood forest types is a result of soil moisture conditions, which make growth of these forest types possible. Bases in soil of the A_1 horizon have an incidental and not causal relation to growth and occurrence of the species present.

11.42.1 : 11.49.6 : 21.3 : 12.26–8. **Forest soils.** *Indian For.* 68, 1942 (329–32).

From soil analyses at Nilambur it is suggested that determination of the molecular ratios—$SiO_2 : R_2O_3$, $SiO_2 : Al_2O_3$, and $SiO_2 : Fe_2O_3$—in the total soil may furnish a better index of lateritic condition and the suitability or non-suitability of the soil for Teak than their determination in the clay fraction, which is the more usual method.

11.42.1 : 21.64 : 11.44 : 11.47.21. LUNT, H. A. **A pot culture experiment with undisturbed forest soil.** *Abstr.* in *Proc. Soil Sci. Soc. Amer. 1941* 6, 1942 (403). [Connecticut Agric. Exp. Sta.] H.S.B.

Two experiments were carried out to determine the effect of certain treatments upon the soil and upon the survival and growth of Spruce seedlings. Results showed that lime raised the pH content of the flooding water, increased the conductivity and the calcium and nitrate content, and reduced the ammonia. The removal by raking of the A_0 layer decreased the nitrate, ammonia, calcium and potassium content of the water; and the removal of the A_0 layer by burning raised the pH and reduced the conductivity and the ammonia content. Fertilizers and lime tended to increase the amount of available nutrients, total nitrogen, and organic matter, and to reduce the soluble iron content. The removal of the A_0 layer by burning or raking, or mixing the A_0 layer into the mineral soil had a similar effect.

The survival of seedlings was low because of damping off, but mortality was less where the A_0 layer was burned, mixed or raked, while growth was stimulated by phosphorus and retarded by raking, mixing or burning the A_0 layer.

11.43. Biology of Soil, including Mycorrhiza

11.43.1 : 11.47.6 : 23.26.4. FINN, R. F. **Mycorrhizal inoculation of soil of low fertility.** *Black Rock For. Pap.* 1, 1942 (116–7).

The inoculation of a seedbed of infertile clay-sand soil with mycorrhizae-forming fungi resulted in the greatly increased growth of infected seedlings. These absorbed substantially larger amounts of nitrogen and potassium than the non-mycorrhizal seedlings whose needles showed the yellow-green colour characteristic of nitrogen deficiency.

11.43.1 : 12.11.23. YOUNG, H. E. **Mycorrhizas.** *Qd. Nat.* 11, 1941 (121–6 + plate). L.S.

A discussion of mycorrhizal activity in relation to plant growth, and the value of applied phosphate in stimulating such activity. It is suggested that the ability of small seedlings to survive under a heavy leaf canopy may be explained by their mycotrophic habit.

11.43.1 : 12.21 : 12.25. FRIES, N. Einspormyzelien einiger Basidiomyceten als Mykorrhizabildner von Kiefer und Fichte. **[Monospore mycelia of some basidiomycetes as mycorrhizaformers on Pine and Spruce.** *Svensk bot. Tidskr.* 36 (2–3), 1942 (151–6). R.A.M. 21 (389).

In the studies described, four mycorrhiza-forming Basidiomycetes, viz., *Tricholoma pessundatum*, *Boletus granulatus*, *B. luteus* and *Scleroderma aurantium*, were grown in flasks containing an acid nutrient solution (potassium dihydrogen phosphate) in contact with Pine seedlings, and the first- and last-named also with Spruce, a total of 80 cultures being maintained. A parallel series of tissue cultures of one- to two-year-old mycelia of the same organisms was also run. At the conclusion of the test, after a period ranging from three to nearly five months for the several species, *T. pessundatum* was found to have produced an abundance of hyphae on the collar of the lateral roots. Mycorrhiza were more numerous on the Pine than on the Spruce

seedlings, and were usually unbranched. The hyphae of *B. granulatus* made luxuriant growth, numerous mycorrhiza being formed on the Pine roots, mostly in the form of single, occasionally in that of double forks. *B. luteus* did not develop so profusely as the foregoing, but two of the monospore mycelia gave rise to distinctly furcate mycorrhiza in all eight flasks containing Pine seedlings. Hyphal growth in the case of *S. aurantium* was sparse, but each of the three monospore mycelia formed mycorrhiza on Pine in at least one flask, only one, however, being similarly active on Spruce (in two flasks). The mycorrhiza produced vigorous, white hyphal strands. Hyphal mantles, Hartig's network, and other typical anatomical features were observed in the mycorrhiza of all four fungi. None of the organisms was investigated in relation to its sexuality, but it is almost certain that the monospore mycelia of *S. aurantium* are haploid.

11.44. Litter. Surface Humus

11.44 : 11.41 : 11.42.1 : 12.19.2 (79.7). FLANNERY, R. D. **Physical character and chemical composition of forest floors under selected forest types in western Washington.** *Abstr.* in *Bull. ecol. Soc. Amer.* 21, 1940 (11). [Dept. of Conservation and Development, Washington.] I.F.B.

Physical and chemical analyses of undisturbed floors under four forests were made from samples collected under Douglas Fir, Sitka Spruce, Western Hemlock and Western Red Cedar in Clallam County in northwestern Washington. In all cases more or less distinct L and F layers were found in the floor but in no case could a definite H layer be found. The Fir and Hemlock floors were similar, both being characterized by low field moisture and maximum water-holding capacities, small thickness, low volume and low dry weights, whereas the reverse was true for the floor types of Cedar and Spruce.

Results of the analysis of ash show that the total amounts of essential plant nutrients stored in the forest floors at the time of sampling were greater in the case of Cedar and Spruce than for Fir and Hemlock floors. Chemical analyses of periodic leachates from the various floor types indicate that calcium and potassium are much more soluble than phosphorus.

The role of the forest floor in limiting the podsolization process in this region is probably the result of ability of trees to maintain a high base content in their forest floors.

11.44 : 11.42.1. JUNKER, E. Zur Kenntnis der kolloidchemischen Eigenschaften des Humus. Beitrag zur Dispersitätschemie des Lignins. **[On the colloido-chemical properties of humus. A contribution to the knowledge of the dispersiveness of lignin.]** *Extract* from *Kolloid-Zeitschrift* 95 (2), 1941 (213–50). [G.g.] [Eidgenössische Technische Hochschule, Zürich.] P.R.

11.44 : 43.3 : 46 : 11.62.1. DIEBOLD, C. H. **Effect of fire and logging upon the depth of the forest floor in the Adirondack region.** *Proc. Soil Sci. Soc. Amer. 1941* 6, 1942 (409–13). [U.S. Forest Service.] H.S.B.

As a result of forest fires, the median depth of forest floor in burned areas of the Spruce/Fir slope type was 2 in. in contrast to 14 in. in unburned areas. Approximately 30,000 acres of the Spruce/Fir type were classified as having nearly all of the humus layer destroyed and moderate to severe erosion of the mineral soil. On the lower slopes in the Spruce/hardwood type the humus is again being built up by Aspen, Yellow Birch, and Paper Birch.

Logging operations as compared with fire are a minor factor in reducing the depth of humus, although indirectly logging results in conditions of high fire hazard, especially in the Spruce/Fir slope type. From data at present available the decrease in depth of humus following clear-cutting appears to be less than 2 in. *From author's summary.*

11.44 : 11.47.2 : 11.47.6 : 11.41.5–6 : 12.25. HEIBERG, S. O. **Silvicultural significance of mull and mor.** *Proc. Soil Sci. Soc. Amer. 1941* 6, 1942 (405–8). [New York State College of Forestry.] H.S.B.

The application of slash (organic matter) to young Spruce and Pine plantations on worn-out agricultural soil had a marked stimulating effect on tree growth and foliage development. The significance of the "mull" and "mor" forest humus layers is discussed in relation to fire, water infiltration, and the growth of White, Red and Scots Pine and Norway Spruce. The importance of earthworms in fertilizing and aerating forest soils is emphasized.

11.47. Maintenance of Favourable Soil Conditions

11.47.1 : 56.02 : 12.26–8. FINN, R. F., and TRYON, H. H. **The comparative influence of leaf mould and inorganic fertilizers on the growth of Red Oak.** *Black Rock For. Pap.* 1, 1942 (108–9).

Leaf mould, sodium nitrate and superphosphate were each applied to plots on an area bearing a mixed Oak overwood. The previous stand had been clear cut in 1895 and the area had been cut over and severely burned several times previously. Greatest increase in radial growth of the Oak was obtained with the organic fertilizer.

11.47.1 : 22.89. WILDE, S. A., and WITTENKAMP, R. **Duff briquette fertilizers: their preparation, use, and effect upon the growth of trees and other plants.** *J. Amer. Soc. Agron.* 34, 1942 (736–46). [University of Wisconsin, Madison.] A.P.B.

Briquettes are made of a mixture of partially decomposed hardwood-Hemlock forest litter and acid lacustrine clay treated with a solution of ammonium sulphate, potassium nitrate and ammonium phosphate. Their use with ornamental trees and shrubs, nursery beds, berries, truck crops and flowering plants gave very satisfactory results and the favourable effect was greatly increased under conditions of artificial watering. The beneficial effect of the briquettes is partly due to the release of growth-promoting substances (vitamins and hormones), which are particularly effective in improving the growth of forest vegetation on quartz sand or on prairie soils.

Results from the fertilization of forest plantations on cut-over lands varied widely. An appreciable increase in the rate of tree growth was observed only on soils which were radically deficient in certain nutrient elements, depleted in organic matter, or had not previously supported forest vegetation. Pines and other light-demanding pioneer species on fairly productive sandy soils showed only a small average increase in height growth due to fertilization with briquettes.

11.47.1 : 23.26.4 : 24.25. FINN, R. F. **Notes on the resampling of certain fertilized plots.** *Black Rock For. Pap.* 1, 1942 (104–5).

The following results were observed 4–5 years after fertilizing:—(1) plots fertilized with sodium nitrate-ammonium sulphate showed a significant decrease in available nitrogen; (2) plots fertilized with dried blood showed a significant increase in available nitrogen; (3) rock phosphate plots showed a significant decrease in available phosphorus; (4) potassium availability increased on plots fertilized with potassium chloride; (5) nitrogen availability can be increased by proper thinnings.

11.47.2 : 11.42 : 11.44. ROSEVEAR, D. R. **Soil changes in Enugu plantations.** *Farm and Forest* 3, 1942 (41).

In the Enugu pitwood plantation (Southern Nigeria) changes have been noted after a period of sixteen years in the ground cover composition and in soil colour and texture—from a hard red laterite to a buff clay—apparently due to a change in forest composition.

11.49. Soil Types

11.49.0 : 11.62.3. EATON, T. H. **Effect of submergence on a podzol soil profile in the Adirondack forest.** *Soil Sci.* 53, 1942 (379–83). [Cornell University.] L.S.

Examination in 1941 of an area in the Adirondack Forest that was cleared of timber and flooded in 1911–12, and thereafter for some 15 years, revealed a podzol profile below the former lake continuous with that of the unaffected forest, except for some erosion at the beach line. Since its exposure the lake bed had been invaded by soil fauna which, however, had not yet influenced the structure or composition of the organic layer.

11.49.3 : 11.41 : 11.42 : 11.62.1. ZAKHAROV, P. J. **Physical and chemical properties of eroded forest-steppe soils.** *Proc. Lenin Acad. agric. Sci. USSR* 6, 1941 (32–5). [R.] E.A.G.B.

A discussion based on analytical data of grey forest-steppe soils. The proportion of soil particles 0·001–0·05 mm. in size was smallest in the most eroded soils.

11.49.3 (71.11) : 60. WYATT, F. A., NEWTON, J. D., and IGNATIEFF, V. **Wooded soils and their management.** *Bull. Univ. Alberta Coll. Agric.* No. 21, (revised ed.) 1941. pp. 39 + plates.

Although the wooded soils of Alberta are mainly of low fertility, there are extensive areas that could be satisfactorily farmed under careful management. These soils are described, and methods of agricultural management are suggested.

11.49.6 : 21.3. DHARESHWAR, S. S. **Laterite, its petrology and relation to plant growth.** *Indian For.* 68, 1942 (315–24).

Laterite is regarded as a subsoil formation produced by the weathering of basic rocks under alternate wet and dry tropical conditions. It occurs on the surface only when exposed by erosion. The overlying, usually red, soil is the product of distintegration and decomposition of laterite. The fertility of laterite is largely a function of its water-holding capacity. When underlying a thick soil layer it is usually a favourable medium for root growth.

11.6. *Hydrographical Conditions. Water and Soil Conservation*

11.6 : 11.41.8 : 11.41.5–6. HURSH, C. R., and HOOVER, M. D. **Soil profile characteristics pertinent to hydrologic studies in the Southern Appalachians.** *Proc. Soil Sci. Soc. Amer. 1941* 6, 1942 (414–22). [Appalachian For. Exp. Sta., Asheville, N.C.] H.S.B.

The two most essential soil profile characteristics pertinent to hydrologic studies are storage opportunity and the transmission rate of water, both of which are functions of porosity.,

11.62 : 11.44 : 91.3. DREIBELBIS, F. R., and POST, F. A. **An inventory of soil water relationships on woodland, pasture, and cultivated soils.** *Proc. Soil. Sci. Soc. Amer. 1941* 6, 1942 (462–73). [Soil Conservation Service.] H.S.B.

Precipitation accounted for 77·2, 85·7, 79·4 and 84·9 per cent. of the total increase in soil water for woodland, pasture, cultivated Muskingum silt loam, and cultivated Keene silt loam, respectively. The maximum amount of active soil water was 9·39, 8·36, 7·09 and 8·03 in. respectively. Percolation accounted for 5 per cent. of the water disposed of on Keene silt loam, and 29·9 per cent. on Muskingum silt loam. Percolation in woodland soils has not been definitely ascertained. Run-off constituted only 2 per cent. of the water disposed of in woodland, 1·4 per cent. in the pasture, 13·5 per cent. in the Muskingum silt loam, and 15·0 per cent. in the Keene silt loam.

11.62 : 91.3 : 11.14.3. WARREN, W. D. M. **Contour trenching vs. irrigated plantations de novo de novo.** *Indian For.* 68, 1942 (133–8).

A comparison of contour trenching in Bamiabura with irrigated plantations in the Punjab. It is pointed out that the amount of run-off water which can be held up by contour trenches is much greater than the amount ordinarily available for irrigated plantations in arid regions, owing to severe competition with agricultural crops.

11.62.1 (68.6). MACKAY, J. H. **The soil erosion problem in Basutoland.** *Farm and Forest* 3, 1942 (14–9).

Uncontrolled grazing, kraaling and indiscriminate burning are considered to be principal causes of pasture deterioration and soil erosion in South Africa. There are two aspects of the problem of deterioration in Basutoland, that of the lowland arable land, and that of the mountain pastures. Measures to stop erosion in the lowland areas include the construction of contour banks and furrows and dams, the fencing off of seriously eroded lands, and, to a small extent, the planting of trees. *Populus canescens* is particularly effective in checking erosion. The mountain area includes two main types of grassland: Seboku grassland, in which there is serious erosion, and Letsiri grassland, in which erosion is comparatively slight. In dealing with the Seboku grasslands, rotational grazing and a reduction in the number of stock may prove effective, and it is suggested that afforestation, especially with Poplar and Wattle, would be of great value on the steeper slopes.

11.62.1 (68.6 : 66.9). SPOTTISWOODE, H. **Soil conservation—in Basutoland and in Nigeria.** *Farm and Forest* 3, 1942 (109–12).

The urgency of the soil erosion problem in Basutoland before counter measures were put into effect [cf. preceding abstract] is emphasized and it is pointed out that in Nigeria soil degradation is taking place in a number of areas and may reach a serious state unless appropriate measures are taken. Consideration is given to the reaction of the Nigerian community to possible methods of approach by administrative and technical officers in dealing with this problem.

11.62.11 : 11.44 : 23.24 : 12.26–8. READ, H. A. ***Eucalyptus saligna* and soil reclamation.** *J. S. Afr. For. Ass.* No. 7, 1941 (50–2 + plate).

On an area with a relatively high rainfall, a deep soil and a mild and frost-free climate, where, as a result of past misuse of the land the humus layer had been eroded and the soil was too poor for agriculture, plantations of *Eucalyptus saligna* were established 20 years ago. In that period the trees shed much debris including branches, leaves and bark, and this, together with the debris left when the trees were clear cut, built up a 10-in. blanket of humus on the eroded soil. The yield of ash per ton of air-dried bark of this species was found to be 33·6 and 51·5 lb. for new and old bark respectively. Analysis of ash showed the following results:—lime (CaO) 25·5–31·3 per cent., potash (K_2O) 4·65–8·5 per cent., phosphoric oxide (P_2O_5) trace–0·32 per cent. Grasses introduced on the area after the trees had been cut showed vigorous growth.

11.62.11 : 60 (66.9) : 23.24 : 12.26–8. STEWART, J. L. **A few notes on tsetse clearings and tree planting.** *Farm and Forest* 3, 1942 (9–10).

In connexion with a tsetse eradication scheme in the Pong-Tamale area of the Gold Coast, shrubs and certain forest trees were cleared along the river banks. A dense mat of grass soon became established on the cleared areas and it was found that, as long as certain precautions were taken, erosion was less severe than before the clearing. Although farming should not be allowed on the cleared banks, dry-season grazing may be permitted if it is properly controlled. In compensation for the clearings, plantations of indigenous trees were made on the upper levels. Species found to be particularly suitable for this purpose were *Anogeissus schimperi* and *Sclerocarya birroea*.

11.62.21 : 91.3. WICHT, C. L. **Depletion of ground-water flow in Jonkershoek streams.** *J. S. Afric. For. Ass.* No. 8, 1942 (50–63).

A preliminary study of ground-water flow from small, natural, untreated catchments at the Jonkershoek Forest Influences Research Station is presented. This investigation is intended ultimately to provide a criterion for the assessment of the effect of afforestation, veld-burning, grazing and protection of natural vegetation upon the stability of streamflow. It is shown that the regression of ground-water flow after a unit period of depletion on flow at the beginning of that period is linear. From this regression an equation for constructing ground-water depletion curves is derived. The coefficient of the linear regression of ground-water flow depletion, the regression function and the depletion curve equation are suggested as suitable statistics to be used to demonstrate the effects of catchment management on ground-water flow in streams. Finally, the hydrological interpretation on these statistics is discussed. *Author's summary.*

11.62.22 : 07.7. DIEBOLD, C. H. **An interpretation of certain infiltration values in forest areas obtained with the type F and type FA infiltrometers.** *Proc. Soil Sci. Soc. Amer. 1941* 6, 1942 (423–9). H.S.B.

11.62.22 : 11.11.2 : 91.3. AUGUSTINE, M. T. **Infiltration runs on frozen ground.** *Abstr.* in *Proc. Soil Sci. Soc. Amer. 1941* 6, 1942 (455). [Allegheny Forest Exp. Sta.] H.S.B.

Studies were undertaken to determine the effect of frozen ground upon infiltration in areas of good forest, pasture and corn stubble. It was found that almost normal infiltration rates were obtained on a forest soil that was frozen to a depth as great as 4 in., although infiltration fell off during the wets runs, due, apparently, to the pore space being effectively sealed by the moisture from the initial run.

11.62.22 : 43.3 : 45.11. AREND, J. L. **Infiltration as affected by the forest floor.** *Proc. Soil Sci. Soc. Amer. 1941* 6, 1942 (430–5). [Southern Forest Exp. Sta.] H.S.B.

1. Results from tests made on seven soil types in Missouri under upland hardwood stands indicates that annual woods burning reduces the rate of infiltration of water into the soil an average of 38 per cent. in comparison with that measured on soils protected from fire and grazing for approximately 5 to 6 years. 2. The seven soil types tested in fairly heavily grazed unimproved pasture had final infiltration rates 59 per cent. lower than those of similar soil types under hardwood stands protected from fire and grazing. 3. When the hardwood litter and F layer were removed from four soil types to test the direct effects of the forest floor on infiltration, the average final infiltration rate was reduced 18 per cent. 4. To test some of the indirect effects of the forest floor on infiltration the final infiltration rates of four soil types having the hardwood litter and F layer removed mechanically were compared with those of similar soils where the forest floor had been burned annually and in unimproved open pasture. The average final infiltration rate was lower by 18 per cent. for the burned forest floor condition and 51 per cent. for the pasture condition. All differences were highly significant. *From author's summary.*

11.62.3 : 91.3 : 12.11.14. WICHT, C. L. **Diurnal fluctuations in Jonkershoek streams due to evaporation and transpiration.** *J. S. Afr. For. Ass.* No. 7, 1941 (34–49).

Records of streamflow from the Jonkershoek Forest Influences Research Station show diurnal fluctuations during warm rainless weather, which must be due to evaporation and transpiration losses of water from the streams and their banks. The fluctuations are discussed and compared with those observed in streams and wells in the Santa Ana River Valley, California. The form of fluctuations is interpreted on the basis of Troxell's hypothesis in modified form, according to which the fluctuation curve reflects the rate of change of differences between additions to, and extractions from, water storage (i.e. the immediate sources of water supply of the stream); and the effect of a change in such differences is delayed at the point of gauging. It is claimed that an indirect relative measure of evaporation and transpiration losses along stream courses may be based on the fluctuations and used in evaluating the hydrological effects of different types of vegetation and land management in catchment areas, provided the relationship of daily water losses from streams to an independent measure of weather conditions promoting evaporation and transpiration can be established. At Jonkershoek the only measure of this type generally available is the maximum daily temperature. The suitability of linear regressions of daily water loses on maximum daily temperature is discussed, and distinct regressions are shown for three streams.

11.62.31 (78) : 07.2. WILM, H. G. **Watershed management research in the Rocky Mountain region: I. Why research in watershed management? II. Forests, snow,**

and rain. III. Grass, water, and erosion. *Repr.* from *Colorado Soc. Engnrs.' Bull.* May, June, July, 1941. pp. 6. [Rocky Mountain Forest & Range Exp. Sta.]

An account of investigations that are underway to determine (1) the influence of coniferous forest cover and its treatment on snow storage and run-off on the high altitude watersheds of the Rocky Mountain main range, and (2) the relation of grass as well as timber to water yields and erosion on the front range, where the most important studies are concerned with the influence of grazing on run-off and erosion through its effect on the grass cover.

11.62.31 : 11.44. MOREY, H. F. **The relationship of humus to the vegetation-soil complex and its application to the flood control problem.** *Abstr.* in *Proc. Soil. Sci. Soc. Amer. 1941* 6, 1942 (422). [Allegheny Forest Exp. Sta.] H.S.B.

The investigation consisted of the following studies:– (1) Age of stand-humus depth studies. (2) Correlation of humus type with vegetal cover-soil complex. (3) Moisture depletion of soil and humus by cover types. (4) Derivation of soil moisture depletion curves for each cover-soil complex. (5) Synthesis of the soil moisture depletion curve for the watershed. The method has been successfully used for evaluating the effect of various land-use practice upon run-off in the Upper Connecticut River watershed.

12.1. *General Botany*

12.11. Physiology. Reproduction. Growth

12.11.1. *Metabolism. Plant Constituents. Sap Flow*

12.11.1. GIBBS, R. D. **Studies in tree physiology. III. The effect of the method of cutting on the water content of twigs. A note on a paper by McDermott.** *Canad. J. Res.* 20, Sec. C., 1942 (236–40). [McGill University, Montreal.] A.P.B.

Significantly higher water contents are found in short samples of twigs isolated by simultaneous cuts than in samples isolated by consecutive cuts in which displacement of water obviously takes place. This is in agreement with the results of McDermott [cf. *For. Abs.* 3 (198).] *From author's summary.*

12.11.1 : 12.21 : 44.3. BURKHOLDER, P. R., and MCVEIGH, I. **Pyridoxine as a growth factor for *Graphium*.** *Science, N.Y.* 95, 1942 (127–8). [Osborn Botanical Laboratory, Yale University.] L.S.

In experiments to determine the vitamin requirements of *Ceratostomella* (*Graphium*) *ulmi* a series of basal media were used in which one of the 8 vitamins was omitted at a time to give 8 kinds of single deficiencies, and secondly, each of the 8 vitamins was added singly to the basal medium. In both cases growth occurred only in the media containing pyridoxine (vitamin B_6).

12.11.1 : 12.25. BURNS, G. R. **Photosynthesis and absorption in blue radiation.** *Amer. J. Bot.* 29, 1942 (381–7). [Vermont Agric. Exp. Sta.] O.B.D.

Data on the relative photosynthetic efficiencies of White Pine, Norway Spruce and Marquis wheat in monochromatic radiation at several wavelengths. Rough measurements were made of the absorption and the primary absorption at the same wave lengths.

12.11.11. BURKHOLDER, P. R., and SNOW, A. G. **Thiamine in some common American trees.** *Bull. Torrey bot. Cl.* 69, 1942 (421–8). [Osborn Botanical Laboratory, Yale University.] O.B.D.

An account of experiments undertaken to study the occurrence and distribution of thiamine in tree species, using *Phycomyces blakesleeanus*, a fungus whose growth is largely controlled by this vitamin or its components.

12.11.11 : 12.11.16 : 12.26–8. BOIS, E., and CHUBB, W. O. **The sap of the Birch tree, *Betula papyrifera*. Marsh.—I. The amylase system.** *Canad. J. Res.* 20, Sec. B., 1942 (114–20). [Laval University, Quebec.] A.P.B.

The amylase system of Birch sap consists of a cellobiogenic amylase and most probably a glucogenic amylase. The optimum conditions of pH and temperature are pH 5·5 at 4° C. to 6·3 at 60° C. The maximum production of cellobiose occurred at a temperature of 50° C. at the optimum pH for this temperature. The optimum conditions for the production of glucose were pH 5·5 and a temperature of 50° C. It is felt that these new facts throw some additional light on the constitution of starch, and that possibly Birch sap might serve as a source of cellobiose. *From authors' summary.*

12.11.12 : 12.11.15 : 44.3 : 23.27. MAY, C. **Methods of tree injection.** *Trees, Sta. Monica, Calif.* 4 (6), 1941 (7, 10–2, 14, 16). [Bureau of Plant Industry, U.S.D.A.]

A historical review, quoting 21 references, on methods of, and apparatus for, tree injection since it was first undertaken by Hadje de Granada in 1158. The review is concerned primarily with the direct introduction of substances into tree tissues for the following purposes:— (1) tracing the course of the transpiration stream and the distribution of various substances, (2) stimulation of growth, flowering, or fruiting, (3) the diagnosis and correction of various mineral deficiencies, (4) prevention and cure of fungus diseases and control of insect pests, (5) investigation of internal diseases, and (6) colouring foliage for ornamental effects.

12.11.15 : 12.11.22. RAPPAPORT, J. Vergleich der Anwendbarkeit von Wuchsstoffen in Pulverform oder Lösung in bezug auf die Wurzelbildung bei Stecklingen verschiedener Pflanzen. **[Comparison of the suitability of growth substances in powder form or in solution with reference to root development in cuttings of various plants.]** *Monthly Bull. agric. Sci. Pract.* 32, 1941 (385–96). *Abstr.* in *Chem. Zbl.* 16 (2023). P.O.

In all the cases investigated better results were obtained by using growth substances in solution than in mixture with a carrier such as talc dust. However, the latter method requires less time and accuracy and is frequently preferred in practice; it is the only method possible in treating cuttings of species such as *Azalea indica, Ficus elastica, Araucaria excelsa*, etc. on which solution treatments have a harmful effect.

12.11.2. *Propagation. Growth. Development*

12.11.21 : 12.26–8 : 12.11.22. JOHNSSON, H. Generativ och vegetativ förökning av *Populus tremula*. **[Sexual and vegetative propagation of *Populus tremula*.]** *Svensk bot. Tidskr.* 36, 1942 (177–99). [Sw.] L.S.

An outline is given, based largely on recent work by the Swedish Forest Tree Breeding Association, of the propagation of Aspen. (i) *Reproduction by seed:*— Aspen has a short seed-maturation period and under constant optimal conditions this can be made so short that cut branches kept in water will live long enough for development from the flower-bud to the

seed-ripening stage. An ordinary greenhouse is used, fitted with powerful electric lighting kept on at night as artificial seed raising is best done in winter, when natural light is insufficient. Clear-glass 1,000-watt lamps at 2 m. intervals and 1·5 m. above the benches have proved suitable. Flower buds can be distinguished in early autumn; they differ conspicuously from leaf buds in their tumid, round shape, being almost as broad as long. The cut branches, 7–8 dm. long and with plenty of flower buds, are placed in water in 2- to 3-l. glass pots, ♂ and ♀ separately. Flowering begins after about a week, when pollen is collected in glass cylinders and dusted on the ♀ catkins with a small brush. During the whole period, contamination must be guarded against by frequent changes of water and by cutting the base of the branches clean. Seed ripens 2–3 weeks after pollination. The initial seed viability is generally 100 per cent. or a little under, but declines rapidly, so that immediate sowing is advisable. Sowings are made in sterile fine quartz sand, as disease can cause serious losses; the sand must be thoroughly moist and the seed is simply pressed down without covering. The boxes are then covered with glass and no watering done before germination, which occurs after 2–3 days. After a further day or two the glass is removed and water is given night and morning. A week after germination the water is supplemented by nutrient solution, doses of which are then repeated weekly. Pricking out is done after about a month, when two leaves have developed, the plants being spaced about 3 × 4 cm. A mixture of hardwood soil and sand can now be used, though pure sand may still be advantageous, and in either case watering with nutrients must continue. At this stage mites may be a pest and must be controlled by repeated spraying. Temperatures should be kept below + 25° C. by shading the glass roof. By May–June the plants are 6–8 cm. high and must be transplanted to a cold frame or the open, at a spacing of 10 × 12 cm., in good garden soil that has been fertilized in the spring and is given a further application of nitrogenous fertilizer when the plants are well rooted and have begun to grow. Heavy shading is necessary at first, but shading becomes unnecessary in the latter half of July. Water and aeration are the chief requirements thereafter. Disease, especially those due to *Fusicladium radiosum* and *Melampsora*, may still result in losses. A good seedling crop reaches an average height of 60–70 cm. after the first summer; hybrids between Aspen and related species often attain an average height of 1 m. The plants are ready to put out in the following spring. Research on planting technique is still in progress, but it seems probable that cutting back almost to soil level, either at planting time or 1–2 years later, is advantageous. Exact costs are unknown but certainly rather high, hence only the best Aspen sites should be planted and adequate protection given against game. (ii) *Vegetative propagation:*—(*a*) *Suckers* are difficult to transplant as they generally have no proper root system. (*b*) *Root cuttings* have mostly given poor results owing to failure to shoot and root properly and liability to disease. Experiments in 1939 showed that sand was the best rooting medium, better results were obtained from thicker cuttings treated with Uspulum, and clones varied widely in rooting capacity. The best clone + best treatment gave 60 per cent. rooted plants. The shoot often formed adventitious roots and could then be detached from the root cutting and grown separately. In 1941 trials were made of root cuttings from 9 clones, taken at the end of May and treated with growth substance. Three thicknesses (2 cm., 1 cm., and less than 1 cm.) were used. The cuttings were stored in moist moss in glass-covered boxes in the greenhouse. Sprouting began after 2 weeks and when the shoots were 5 mm. long the cuttings were transferred to earth in propagating frames. At a shoot length of 3–4 cm. they were dug out, the lower half of the shoot smeared with 1 per cent. β-indolyl-butyric acid in lanolin paste, and replanted so that soil covered the treated portions. Where good rooting took place the old root piece was cut away to give completely regenerated plants. Of 5,248 root cuttings 6·4 per cent. of plants were obtained. The thickest grade gave 11·2, the medium 6·7 and the thinnest 1·3 per cent. rooted plants. The best clone gave 13 per cent. and the worst 1·7 per cent. rooting, and the thickest cuttings of the best clone 27·2 per cent. There was clonal variation in shoot development but this was independent of clonal variation in rooting capacity. Further research is needed on the conditions affecting propagation by this method. (*c*) *Layering* may be carried out with 1- to 2-year-old plants having a long current-year shoot, obtained from the mother clone by root cuttings or grafting. These are planted as nearly as possible horizontally in loose hardwood soil mixed with sand, and their stems pegged to the soil surface. When the lateral branches have grown vertically to 5–6 cm. length their basal half is coated with heteroauxin in lanolin and soil heaped over. In the following spring it should be possible to separate the individual rooted branches by cutting. The experiments with this method have been too restricted to bear close analysis, but the best heteroauxin concentration appeared to be 1 per cent. and there was clonal variation in rooting. (*d*) *Stem cuttings:*—No successful rooting can be reported. (*e*) *Grafting* is costly but might possibly pay for specially good clones. It can also be combined with layering to secure more than one plant from each scion. Decay at the point of union between stock and scion may give trouble.

Though methods of vegetative propagation yield ample material for experimental purposes, they are not yet sufficiently advanced to enable mass propagation, as in the case of propagation by seed.

12.11.21 : 23.23.11 : 12.25. Allen, G. S. **Parthenocarpy, parthenogenesis, and self-sterility of Douglas Fir.** *J. For.* 40, 1942 (642–4). [B.C. Forest Service.]

Bagging experiments indicate that Douglas Fir may be highly self-sterile and that parthenogenesis may occur to a limited extent. Pollination and fertilization have no apparent effect upon the growth of the cone; therefore there is no easy way to determine whether or not the cones have been adequately pollinated without examining the seeds.

Parthenocarpy, or the production of fruits without pollination or fertilization, is the normal condition in Douglas Fir, but the seeds are usually empty. Abortions of immature conelets are non-existent in the bagged series; the evidence indicates that the critical period is the time of bud bursting and emergence of the conelet.

It is suggested that one of the major factors influencing seed quality is cross-pollination. Many reported cases of low-quality seed obtained from isolated trees, or from the few trees bearing in a poor seed year, may

result from the absence of pollen or from self-pollination. *Author's summary.*

12.11.22 : 12.25 : 12.11.15. FARRAR, J. L., and GRACE, N. H. **Vegetative propagation of conifers. XII. Effects of media, time of collection, and indolylacetic acid treatment on the rooting of White Pine and White Spruce cuttings.** *Canad. J. Res.* 20, Sec. C., 1942 (204–11). [Dominion Forest Service.] A.P.B.

Semi-monthly collections of White Pine and White Spruce cuttings were taken from July to October, 1939, and propagated in several media. Collections of both species were taken in late October to examine the effect of type of cutting and of planting in media involving different proportions of two sands and two different peats. Cuttings were dusted with a series of concentrations of indolylacetic acid in talc. The season of collection and the medium used for propagation were the factors of main importance. Phytohormone treatment failed to demonstrate appreciable effect, no difference in rooting response could be attributed to the kind of sand used, but there were indications that response increased with the amount of sedge peat in the medium.

Rooting of White Pine cuttings collected in late August and propagated in a sedge peat medium was 62 per cent., earlier and later collections gave substantially less rooting. Sand only and the sphagnum peat media were generally inferior to the sedge type of peat. At the optimum season of collection the sphagnum peat effected 50 per cent. rooting.

The late July collection of White Spruce cuttings effected rooting of 90 per cent. of the plain cuttings when propagation occurred in a sedge peat medium. Low percentages rooted in sand or sphagnum peat media. Cuttings with a heel of old wood tended to be superior to plain cuttings in respect to survival and rooting.

Preliminary experiments with spring and early summer collections of both species resulted in slight rooting. Likewise, greenhouse propagations of dormant material gave very poor results. *Authors' summary.*

12.11.22 : 12.25 : 12.11.15. DORAN, W. L. **Propagation of Umbrella-Pine by hormone-treated cuttings.** *Contr. Mass. agric. Exp. Sta.* No. 414, 1941. p. 1.

Cuttings from a 60-year-old Umbrella-Pine (*Sciadopitys verticillata*), consisting of short laterals of 1-year-old wood from the lower part of the tree, gave 92 per cent. rooting following treatment with a relatively concentrated solution (100 mg./1.) of naphthaleneacetic acid for two hours. The rooting medium was sand peat in a greenhouse temperature of 70° F.

12.11.3. *Heredity. Breeding. Hybridization. Races and Questions of Provenance*

12.11.3 : 12.26–8. JOHNSSON, H. **Cytological studies of triploid progenies of *Populus tremula*.** *Hereditas, Lund* 28, 1942 (306–12). C.G.B.

The chromosome numbers have now been determined in 1,665 F_1 diploid × triploid hybrids and in 308 individuals from four crosses of triploid × triploid. Practically all theoretically possible chromosome numbers occurred in the hybrid; though there was an excess of individuals with the diploid number. The viability of both aneuploid gametes and embryos seems to be peculiar to the Aspen and may be associated with secondary polyploidy. The aneuploid individuals are however low in vitality, particularly those with chromo some numbers above 57. Among the euploids, th triploids grew faster than the diploids, whereas th tetraploids were inferior. Triploidy thus seems to b the optimal degree of polyploidy, and tetraploidy th limit of viability. P. S. H.

12.11.3 : 12.26–8 : 12.11.22 : 23.25 : 33.02. VOGELSANG P. **Hybrid Poplars.** *Paper Tr. J.* 113 (20), 1941 (38–40) [The Dow Chemical Co., Midland, Mich.] P.R.

Experiments have been undertaken with the objec of producing hybrid Poplars that have good pulpin qualities, maintain rapid growth, are disease and insec resistant, and can be established at low cost on land otherwise unproductive. Comparative tests were made by the sample-plot method. The hybrid Poplars so fa developed have a high rate of growth, and a return can be realized in from 6 to 12 years. All hybrid varieties are propagated from cuttings from first-year wood. These should be made from main shoots ½ in. or more in diameter and at least 12 in. long. Sometimes it is advisable to treat the cuttings with root hormone before planting, but usually this is not necessary. Better rooting is obtained from cuttings made in the fall and stored upside-down in moist, sterile sand at a temperature just above freezing. Although growth is rapid, the wood is quite dense, contains a higher percentage of alpha-cellulose than the native Aspens and has usually somewhat longer fibres.

12.11.3 : 23.23.1. WETTSTEIN, W. VON. Saatgut und Züchtung. [Seed and breeding.] *Forstwiss. Cbl.* 64, 1942 (135–43). [G.] [Kaiser Wilhelm-Institut für Züchtungsforschung, Erwin Baur-Institut, Müncheberg (Mark).]

General principles of the selection of maternal trees for seed harvesting are recapitulated and illustrated with data from various observations by the writer.

12.14. Organography. Morphology. Anatomy. Histology

12.14.5 : 12.11.23 : 12.25. CROSS, G. L. **Structure of the apical meristem and development of the foliage leaves of *Cunninghamia lanceolata*.** *Amer. J. Bot.* 29, 1942 (288–301). [University of Oklahoma.] O.B.D.

The apical meristem and the ontogeny of the foliage leaf of *Cunninghamia* are described. It is concluded that the shoot apex of this species is less specialized and, therefore, probably more primitive than are those of *Taxodium* and *Cryptomeria*.

The origin and development of the foliage leaf of *Cunninghamia* are essentially as described for *Taxodium* and *Cryptomeria*, while *Cunninghamia* differs from the other two species in the number and arrangement of resin canals within the leaf. *From author's summary.*

12.19. Geographical Distribution. Plant Geography and Sociology

12.19 (71.1) : 11.1. PILLSBURY, R. W., and HUTCHINSON, A. H. **Polygonal bio-climatic charts of British Columbia trees.** *Abstr.* in *Bull. ecol. Soc. Amer.* 22, 1941 (12). [University of British Columbia.] I.F.B.

The complex climatic relations of tree species occurring in British Columbia are charted on a standard bio-climatic scale for temperate biomes. On this basis the species are grouped into bio-climatic classes. Members of each class are potentially associated as areal formations; it is recognized that the development

of potential bio-climatic formations may be inhibited by edaphic and biotic barriers.

12.19 : 12.25 : 56. ROHMEDER, E. Die Zirbelkiefer (*Pinus cembra*) als Hochgebirgsbaum. [***Pinus cembra*, a high-mountain tree.**] *Jahrb. d. Vereins z. Schutz. d. Alpenpflanzen u.-Tiere* 1941. pp. 18. [G.] *Abstr.* in *Forstarchiv* 18, 1942 (149). [G.]

Notes on the growth and distribution of *P. cembra* in the Alps. Pure stands in Austria covered 10,200 ha. in 1930.

12.19 : 12.26–8. CHISMAN, H. H. **On the range of Shumard Red Oak (*Quercus shumardii* Buckl.).** *J. For.* 40, 1942 (658). [Pennsylvania State College.]

It is pointed out that numerous specimens of *Q. shumardii* have been found in that part of the Cumberland valley south of Chambersburg, Franklin Co., Pennsylvania, and that existing range maps for this species should be changed accordingly.

12.19 : 12.26–8. MOLDENKE, H. N. **The known geographic distribution of the members of the Verbenaceae and Avicenniaceae.** The Author, New York. 1942. pp. 104. Biol. Abs. 16 (16858).

The 2,956 valid species, varieties, forms, and named hybrids in these two families, representing 95 genera, are listed and their distribution throughout the world recorded.

12.19.1. *Regional Floras*

12.19.1 (47.2–6) : 12.14 : 31.1. SUKACHEV, V. N. [Ed.] **Manual for the identification of woody plants.** Goslestekhizdat, Leningrad. 1940. pp. 495. [R.]

A reference work for Soviet foresters and arboriculturists. The manual is divided into seven parts dealing with the identification of woody plants from the characters of (1) leaves, (2) leafless shoots, (3) cones, (4) fruits and seeds, (5) seedlings, (6) timber, and (7) bark.

12.19.1 (729.3) : 34. HODGE, W. H. **Plants used by the Dominica Caribs.** *J. N. Y. bot. Gdn.* 43, 1942 (189–201).

Includes the names of many trees and shrubs used by these West Indian aborigines for domestic and other needs. Among the local timbers used in house-building are mentioned *Tovamita plumieri, Moronobea coccinea, Richeria grandis, Chimarrhis cymosa* and *Simaruba amara.*

12.19.1 (78.2) : 12.26–8 : 12.25. TOLSTEAD, W. L. **Vegetation of the northern part of Cherry County Nebraska.** *Ecol. Monogr.* 12, 1942 (255–92). [University of Nebraska.]

The vegetation consists mainly of grasses. Deciduous trees including *Ulmus americana, Fraxinus lanceolata, Acer negundo,* and *Populus sargentii* are found along the river banks, while Ponderosa Pine occurs on rough stony lands in the valleys, often with grasses and shrubs as an understorey.

12.19.2. *Forest Types*

12.19.2 (43.7). FRANCKE, C., and WHISTLING, F. Vorschläge für die Einteilung des Protektorates Böhmen und Mähren in Wuchsbezirke. **[Proposals for the division into growth districts of the Protectorate of Bohemia-Moravia.]** *Thar. forstl. Jb.* 93, 1942 (1–25). [G.]

Provisionally, 17 districts are distinguished and their characteristics described.

12.19.2 (54.8) : 31 : 12.26–8 : 21. KRISHNASWAMY, K. **The evergreen Ghat rain-forests of the Tunga and the Bhadra River sources.** *Indian For.* 68, 1942 (233–40, 305–12).

Description of the forests, with data on the silviculture, utilization, and timber of *Poeciloneuron indicum* and *Palaquium ellipticum.*

12.19.2 (72 : 728 : 729 : 8). BARBOUR, W. R. **Forest types of tropical America.** *Carib. For.* 3, 1942 (137–50). [E.e.span.] [U.S. Forest Service.]

A general discussion. Dry, deciduous, rain, and temperate rain forests constitute the four important primary forest types.

12.19.2 (728.2). STEVENSON, N. S. **Forest associations of British Honduras. No. 1. *Orbignya-Dialium-Virola* Association.** *Carib. For.* 3, 1942 (164–72). [E.span.]

The association is described. It constitutes the typical high forest of the valley bottoms in the granite, schist, and quartzite zones in the central portion of British Honduras, and in areas of higher rainfall, on limestone and Toledo bed formations, in the south-western portion; it also occurs as levee forest along the rivers draining these areas. No attempt has yet been made to estimate its extent; considerable areas have been destroyed in the making of banana plantations. This association contains a scattered stocking of *Swietenia macrophylla,* but apart from this species, and in some areas *Virola koschnyi,* the timbers are not at present utilized.

12.19.3. *Other Vegetation Types*

12.19.3 : 12.19.2 : 12.19.4 : 11.49.5 (77.4). GATES, F. C. **The bogs of northern lower Michigan.** *Ecol. Monogr.* 12, 1942 (213–54). [University of Michigan.]

The region studied is in a transition zone between the northeastern coniferous forest province and the central or deciduous forest province. Approximately one-third of the area is bogland, the bogs being of the lowland type. The most common typical sere in the bogs is from aquatic associations to the *Carex lasiocarpa* association followed by the *Chamaedaphne* association, the high bog shrub association, tree associations of *Larix* and *Picea,* and climaxed by the *Thuja* association.

12.19.4. *Succession*

12.19.4 : 12.19.3 : 23.1 : 12.25. PRYOR, L. D. **Plant succession and Pine regeneration.** *Aust. For.* 6, 1942 (87–96 + plate).

An account of investigations in clear-felled *Pinus radiata* areas at Mount Stromlo, A.C.T. The succession following clear cutting included a community dominated by clover followed by one of tall annuals, the latter passing to a community dominated by perennial grasses. The latter established itself about 4 years following clear cutting. Unlike *P. ponderosa* var. *scopulorum, P. radiata* does not regenerate naturally among the perennial grasses.

12.19.4 : 12.25 : 11.41 : 11.42 : 21.3. COILE, T. S. **Soil changes associated with Loblolly Pine succession on abandoned agricultural land of the Piedmont plateau.** *Bull. Duke Univ. Sch. For.* No. 5, 1940. pp. 85.

An account of a study conducted in stony clay-loam soil areas in the Duke Forest near Durham, North Carolina, with the object of clarifying interrelations in the changes of soil properties and of vegetation in the

course of development of successive stages of vegetation to the climax forest. [Cf. *For. Abs.* 2 (289).]

12.2. *Special* [*Systematic*] *Botany*

12.25. Gymnosperms

12.25. MATTHEW, O. V. **The Johnson Fir.** *J. For.* 40, 1942 (579–81).

Description of *Abies grandis* f. *johnsoni* f. nov. recorded from Columbia County, Oregon.

12.25 : 2 : 31.0. KOSCINSKI, M. Pinheirinho para cercas vivas. [***Cupressus mexicana* Koch.**] Secretaria da Agricultura, Industria e Commercio do Estado de São Paulo. 1941. pp. 11. [Port.] [*Repr.* from *Boletim de Agricultura* 1939.]

Notes on botanical characters (illustrated with drawings by the author), cultivation, and wood utilization. *C. mexicana* is grown in São Paulo by several cellulose companies. Good results are reported from tests on the use of the timber in pencil manufacture.

12.25 (729.7) : 23.21 : 21.2 : 21.3. BEARD, J. S. **Summary of silvicultural experience with Cedar, *Cedrela mexicana* Roem. in Trinidad.** *Carib. For.* 3, 1942 (91–102). [E.e.span.]

So far, it has proved impossible to grow *C. mexicana* as a crop in evergreen forest areas. The most marked symptom exhibited by unhealthy young plantations is the frequent intermittent loss of leaf during the rainy season when leaf activity is normally at its fullest. This would seem to indicate physiological drought. Some success has resulted in semi-evergreen forests, but growth is so slow and danger of fire so great that it has not been thought worth while to proceed further. *From author's summary.*

12.26-8. Dicotyledons

12.26–8. BARKLEY, F. A. **A new genus of the Anacardiaceae from Colombia.** *Bull. Torrey bot. Cl* 69, 1942 (442–4). [Montana State University, Missoula.] O.B.D.

Description of a new genus, *Ochoterenaea* Barkley, gen. nov., and the type species, *O. colombiana* Barkley, sp. nov., which is a tree growing in dense forests in the mountains of Colombia.

12.26–8. CARABIA, J. P. **The question of *Croton eluteria* and *Croton cascarilla*.** *Carib. For.* 3, 1942 (110–13). [E.span.]

A discussion on the nomenclature of these two species.

12.26–8. CHADWICK, L. S. **Thornless Honeylocust (*Gleditsia triacanthos inermis*).** *Trees, Sta. Monica, Calif.* 5 (4), 1942 (12).

A general description of the appearance and habits of Thornless Honeylocust, its value as an ornamental tree, and the possible utilization of its wood for fence posts and railroad ties.

12.26–8. DE, R. N. ***Rhus kanaka*, R. N. De, sp. novo.** *Indian For.* 68, 1942 (65).

Description of a small Indian tree related to *Rhus continus* Linn., which is found in the Khasi and Jaintia Hills.

12.26–8. GILLY, C. L. **Studies in the Sapotaceae: a new genus from eastern Cuba and a new species from Haiti.** *Trop. Woods* No. 71, 1942 (3–6). [New York Botanical Garden.]

A new genus, *Shaferodendron* Gilly, gen. nov., is proposed for certain specimens from eastern Cuba belonging to the sub-family Mimusopoideae, and two species are described. Also specimens from Haiti previously referred to *Muriea albescens* (Griseb.) Baillon are recognizable as specifically distinct, and the new species *Muriea eyerdamii* Gilly is proposed.

12.26–8. JACOB, K. C. ***Acacia leucophloea*. Willd. and *Acacia alba* Willd.—two species or one?** *Indian For.* 68, 1942 (1–5 + plate). [Agricultural Research Institute, Coimbatore.]

Acacia leucophloea and *A. alba* are identified as separate species, and the differentiating characteristics are listed.

12.26–8. OVSYANNIKOV, V. F. **The Lime tree.** *Lesnoe Khozyaystvo, Moscow*, 1940 (7), (32–6). [R.]

An annotated list of *Tilia* species, varieties, and hybrids little known in the U.S.S.R.

12.26–8. PIERCE, J. H. ***Macroule*, a new genus of the Leguminosae (Sophoreae).** *Trop. Woods* No. 71, 1942 (1–2). [New York Botanical Garden.]

A description of this new genus found in Brazil and British Guiana.

12.26–8 (54 : 59.1). RAIZADA, M. B. **New or noteworthy Apocynaceae from India and Burma.** *Indian For.* 68, 1942 (361–8 + plate).

Aganosma lacei sp. nov. and eleven species new to India and Burma are described.

12.26–8 (7). HOPKINS, M. ***Cercis* in North America.** *Rhodora* 44, 1942 (193–211). [University of Oklahoma.] O.B.D.

A critical study was made of this genus from living material and herbarium specimens. Two species are recognized for North America—*C. occidentalis*, which is restricted to areas west of the Rocky Mountains, and *C. canadensis*, which is found throughout eastern and central United States and with several varieties and forms. Detailed descriptions are given for *C. occidentalis*, *C. canadensis* var. *typica*, var. *texensis*, and var. *mexicana*, with a brief reference to *C. canadensis* f. *glabrifolia*.

12.26–8 (72). MARTÍNEZ, M. **A new genus of Rubiaceae from Mexico.** *Bull. Torrey bot. Cl.* 69, 1942 (438–41). O.B.D.

The proposed new genus is *Balmea* Martinez, gen. nov., and the species *Balmea stormae* Martinez, sp. nov., which is a shrub 4–7 m. high.

12.26–8 (72 : 728). LUNDELL, C. L. **Studies of American spermatophytes—I.** *Contr. Univ. Mich. Herb.* No. 6, 1941. pp. 66.

12.26–8 (72 : 728 : 729.5). LUNDELL, C. L. **Studies of American spermatophytes—II.** *Contr. Univ. Mich. Herb.* No. 7, 1942. pp. 56.

In Part I the author describes 56 new Central American species, mostly from the Yucatan Peninsula in Mexico, the highlands of Chiapas in Panama, and British Honduras. The tree genera represented are *Coccoloba* (5 spp.), *Nectandra* (2 spp.), *Ocotea* (3 spp.), *Persea* (2 spp.), *Phoebe* (5 spp.), *Bauhinia* (1 sp.), *Pithecolobium* (5 spp.), *Amyris* (1 sp.), *Esenbeckia* (2 spp.), *Zanthoxylum* (1 sp.), *Swietenia* (1 sp.), *Bunchosia* (1 sp.), *Quararibea* (1 sp.), *Casearia* (2 spp.), *Clethra* (1 sp.) and *Sideroxylon* (2 spp.).

Part II deals with one new genus of shrubs (*Onohualcoa*, Bignoniaceae), 50 new species, and one new

variety, from Mexico, British Honduras, Guatemala, Costa Rica, Panama and Puerto Rico. The tree genera represented are *Ficus* (1 sp.), *Coccoloba* (2 spp.), *Neea* (2 spp.), *Acrodiclidium* (1 sp.), *Phoebe* (2 spp.), *Pithecolobium* (2 spp.), *Calyptranthes* (2 spp.), *Eugenia* (6 spp.), *Psidium* (1 sp.), *Ardisia* (2 tree spp.), *Parathesis* (2 spp.), *Dipholis* (1 comb. nov.), *Diospyros* (1 sp., 1 var.), *Fraxinus* (1 sp.), *Chiococca* (1 sp.) and *Rondeletia* (1 sp.). Both parts include critical notes and notes on the occurrence of other species.

12.26–8 (72 : 728). LUNDELL, C. L. **Undescribed plants from Mexico and Central America.** *Bull. Torrey bot. Cl.* 69, 1942 (387–99). [University of Michigan.] O.B.D.

Includes descriptions of the following new tree species:—*Celtis petenensis* Lundell, sp. nov. (6–10 m. high), *Ocotea matudai* (7 m. high), *Capparis yucatanensis* (an arborescent shrub, about 4 m. high), *Crataeva glauca* (up to 7 m. high), *Lonchocarpus xuub* (up to 10 m. high), *Trichilia yucatanensis* (up to 20 m. high), *Symplococarpon flavifolium* (5 m. high), *S. lucidum* (a small tree), *Eugenia itzana*, *E. leptopa*, and *E. ovatifolia* (up to 4 m. high), *E. petenensis* (an arborescent shrub or small tree), and *Stylogyne perpunctata* (a shrub or small tree).

12.26–8 (72 : 76.4). CROIZAT, L. **New and critical Euphorbiaceae chiefly from the southeastern United States.** *Bull. Torrey bot. Cl.* 69, 1942 (445–60). [Arnold Arboretum, Harvard University.] O.B.D.

Three new species of *Croton* L. and one of *Manihot* Mill from southwest Texas, and a fourth species of *Croton* from Mexico are described. Proposals are made for three new subgenera and two new combinations of *Tetracoccus* Parry. A note comparing the seeds of *Petalostigma* and *Tetracoccus* is appended.

12.26–8 (729.1). CARABIA, J. P. El genero *Croton* en Cuba. **[The genus *Croton* in Cuba.]** *Carib. For.* 3, 1942 (114–35). [Span.span.e.] [Colegio de la Salle, Habana, Cuba.]

Includes a key to the *Croton* species of Cuba and a botanical description of 33 of these species.

12.26–8 (729.1). RECORD, S. J. **Identity of Acana, Almique, or Doncella wood.** *Trop. Woods* No. 71, 1942 (25).

The wood has been identified as *Manilkara jaimiqui*.

12.26–8 (75.4). TOSH, J. P. **The vascular plants of Raleigh County, West Virginia.** *Castanea* 7, 1942 (55–70).

12.26–8 (81). DUCKE, A. **New and noteworthy Sapotaceae of Brazilian Amazonia.** *Trop. Woods* No. 71, 1942 (7–25).

It is concluded that opposite leaves and sweet bark are not of great value as generic characters in classifying the Sweet Bark trees of tropical America and consequently the genera *Glycoxylon*, *Barylucuma* and *Syzygiopsis* cannot be maintained. It is proposed that the species of *Glycoxylon* be transferred to the genus *Pradosia* Liais. New species of this genus and of *Manilkara* Adans. are described.

12.26–8 : 12.19 : 21 : 23 : 24 : 31.0 : 34.2 : 56 : 57. PRASAD, J. **A note on Semal (*Bombax malabaricum* DC.).** *Indian For. Bull. (n.s.) Silviculture* No. 107, 1941. pp. iv + 15. [Forest Research Institute, Dehra Dun.] P.R.

A revision of an earlier paper that appeared in *Indian Forester* [cf. *For. Abs.* 3 (116)]. The subjects covered in the present bulletin are:—characteristics of the timber and its uses; minor economic products; distribution, locality and types of forest; silvicultural characteristics; methods of management; natural regeneration; artificial regeneration; tending; external dangers and protection; rate of growth; and prices.

12.26–8 : 12.19 (67.6) : 21.32 : 11.42.1. THOMAS, A. S. **A note on the distribution of *Chlorophora excelsa* in Uganda.** *Emp. For. J.* 21, 1942 (42–3).

The distribution and growth of *Chlorophora excelsa* in Uganda, where it is found in most districts up to 4,500 ft., often outside forest areas, appears to be determined largely by the supply of bases in the soil. Apart from the forest areas, natural regeneration of this species is confined largely to patches of slightly alkaline soil marking the sites of former homesteads, to termite mounds, and to soils derived from volcanic rock. In the wetter parts of the country, where wild trees show vigorous growth on such sites, plantations on acid soils have given poor results, the trees remaining stunted and so subject to attack by the gall insect (*Phytolyma lata*) for some years. However, even in the drier parts where the occurrence of wild trees is rare, plantations on soils with a rich supply of bases have given very good results. The tree makes excellent growth on native farms and besides supplying a valuable timber it affords a shade under which many crops, especially coffee, will flourish.

12.29. Monocotyledons

12.29 (729.3). HODGE, W. H. **A synopsis of the palms of Dominica.** *Carib. For.* 3, 1942 (103–9). [E.span.]

13.1. *General Zoology*

13.1 : 45.3. FROST, S. W. **General entomology.** McGraw-Hill Book Company, Inc., New York and London. 1942 (x + 524).

This book has been written with two objects in view, first, to present a general survey of the whole field of entomology, and secondly, to give emphasis to the biological side of the subject. The author's purpose is obviously to place sufficient fundamental knowledge in the hands of his readers, and then to lead them on to survey the vast field in which this knowledge can be applied.

The author has done well to provide his readers with such a wealth of new illustration; very few of the old-time figures have been used in these pages. The book is so arranged that it can be studied in sections, one or several at a time. The bibliographies at the end of each chapter are also sectionally arranged, and the literature brought up-to-date. The McGraw-Hill series of publications in the zoological sciences has already a brilliant list of works to its credit. This volume is a valuable addition to the entomological list. R. N. C.

13.11 : 13.2. CAMPBELL, W. G. **The relationship between nitrogen metabolism and the duration of the larval stage of the death-watch beetle (*Xestobium rufovillosum* de G.) reared in wood decayed by fungi.** *Bio-chem. J.* 35, 1941 (1200–8). [Forest Products Research Laboratory, Princes Risborough, Bucks.] L. S.

13.11 : 13.2 : 31.43. NEEDLER, A. W. H., and NEEDLER, A. B. **Growth of young shipworms (*Teredo navalis*) in Malpeque Bay.** *Repr.* from *J. Fish. Res. Bd. Can.* 5 (1), 1940 (8–10).

Growth of shipworms in Spruce boards from July 6 to November 12 was as much as 24 cm. with, and 5 cm. across, the grain. It was fastest at high temperatures but continued at temperatures below 10° C.

13.14 : 13.2. BROWN, A. W. A., and MCGUFFIN, W. C. **New descriptions of larvae of forest insects. Introduction; I, *Panthea* (Lepidoptera, Phalaenidae); II, *Anomogyma* (Lepidoptera, Phalaenidae); III, *Zanclognatha, Palthis,* and *Autographa* (Lepidoptera, Phalaenidae); IV, *Herculia, Tortrix* and *Argyrotaenia* (Lepidoptera, Pyralidae and Tortricidae); V, *Eupithecia, Hydriomena* (Lepidoptera, Geometridae).** *Canad. Ent.* 74, 1942 (8–12; 21–5; 52–6; 58–61; 150–3). [Division of Entomology, Dept.of Agriculture, Ottawa.] O.R.S.

13.14 : 13.2. RÉGNIER, R. Contribution à l'étude de la biologie du hanneton commun. [**A contribution to the study of the biology of the common May beetle.**] *C. R. Acad. Sci.* 212, 1941 (246–9). R.A.E. A30 (372).

An account is given of the results of observations on *Melolontha melolontha*, L., in Normandy in 1938–40.

13.14 : 13.2 : 45.3. MATHUR, R. N. **On the biology of the Noctuidae (Lepidoptera).** *Ind. For. Rec.* (*n.s.*) *Entomology* 7, 1942 (72–154 + plate). [Forest Research Institute, Dehra Dun.] P.R.

Includes a detailed account of the life history of *Plecoptera reflexa* Guen., an important pest of *Dalbergia sissoo*.

13.14 : 13.2 : 45.3 : 12.26–8. MATHUR, R. N. **On the biology of the parasites of the Shisham defoliators in the Punjab plantations.** With a note:—*Ecological aspects of defoliation in Shisham plantations* by C. F. C. Beeson. *Indian For. Rec.* (*n.s.*) *Entomology* 7, 1942 (1–65). P.R.

13.14 : 13.2 : 45.3 : 12.25. STRUBLE, G. R., and CARPELAN, L. H. **External sex characters of two important native predators of the Mountain Pine beetle in Sugar Pine.** *Pan-Pacif. Ent.* 17, 1941 (153–6). I.I.E.

With reference to the Trogositid *Temnochila virescens* var. *chlorodia* and the Clerid *Enoclerus sphegeus*, the most important insect enemies of *Dendroctonus monticolae* in Sugar Pine.

13.14 : 13.2 : 12.26–8. WALLACE, P. P., and BEARD, R. L. **Larval characteristics of certain Elm bark infesting Coleoptera.** *Canad. Ent.* 74, 1942 (86–7). [Connecticut Agric. Exp. Sta.] O.R.S.

13.19 : 13.2 : 45.3. SELLERS, W. F. **The distribution of the European Spruce sawfly, *Diprion polytomum* (Htg.) in the Scandinavian and eastern Baltic countries.** *Bull. ent. Res.* 33, 1942 (149–59 + plate). [Imperial Institute of Entomology.]

Since 1930 the European Spruce sawfly (*Diprion polytomum*) has caused severe damage in eastern Canada and is a menace to the Spruce woodlands in the north-eastern part of the United States. In 1938 under a co-operative arrangement with the Division of Entomology, Canadian Department of Agriculture, and the Farnham House Laboratory, Imperial Institute of Entomology, England, which were to continue their collecting in the central European area for the recovery of natural enemies, the Bureau of Entomology and Plant Quarantine, United States Department of Agriculture, made a survey of the Scandinavian and eastern Baltic countries to extend the knowledge of the distribution of the sawfly; to discover, if possible, better or equally as good collecting grounds, where new species of parasites might be found; and to obtain additional information regarding the better known species o parasites. The most favourable habitats of the sawfl are found in the one-generation areas under condition which provided a maximum of sun-heat, moisture and shelter, near to the upper limits of Spruce growth The least favourable habitats are the drier, less humi places, especially in the two-generation areas. Th sawfly was found everywhere on Spruce, from th German-Danish border in Denmark and in souther Norway to the northernmost Spruce forests of Sweden and from far above the Arctic Circle in Finlan southward through the eastern Baltic countries o Estonia, Latvia and Lithuania. The range of distribu tion covered in this survey was from approximatel latitude 55° in Denmark and Lithuania to latitude 68 45′ in Finland. This includes most of the Scandinavia Peninsula, Fennoskandia, and the eastern Baltic coun tries. Spruce comprised from 25 to 40 per cent. of th productive forest land of this large area. Larg collections of the European Spruce sawfly were made i Sweden and Finland for the Canadian Division o Entomology. *Author's summary.*

13.19 (47.2–6) : 13.2 : 45.3 : 12.26–8. KELUS, O. G **Geographical distribution and areas of the gypsy-moth outbreaks in the USSR.** *Bull. Plant Prot.* No. 1, 194 (45–52). [R.] R.A.E. A30 (376).

On the basis of data from the literature and un published material and the examination of collection in the Zoological Institute of the Academy of Science in Leningrad, the author gives details of the distributio in the Russian Union of *Lymantria* (*Porthetria*) *dispa* L., and discusses the zones in which mass outbreak periodically take place and those in which they hav not occurred in spite of suitable climatic conditions Tentative estimates of the influence of temperature an humidity in limiting the distribution of the moth ar made by comparing the climatic indices characteristi of the parts of Russia in which it occurs with the result of other observations. Mass outbreaks in these area depend primarily on the presence of the food plants chiefly Oak and Lime (*Tilia*) and, in regions devoid o forests, on the presence of orchards, particularly Appl orchards.

13.2. *Special* [*Systematic*] *Zoology*

13.2 (79.7). PATTERSON, G. K. **The Coleoptera o Washington: Scolytoidea.** *Wash. Univ.* [*Seattle*] *Pubs. Theses Ser.* No. 6, 1942 (113–4). E.S.R.87 (400).

Eighty-eight species of bark beetles representing 3 genera are listed as occurring in the State of Washing ton.

13.2 : 13.14. ESSIG, E. O. **College entomology.** The Macmillan Company, New York. 1942. pp. vii + 90 + map.

In this considerable volume, Professor Essig has per formed the stupendous task of presenting a whol picture of the insect kingdom in a most complete an striking fashion. The weight of the book bears testi mony to the pre-war quality of the paper on which it i printed, while the illustrations, of which there are ove 300, are of the highest standard. The introductory chapters on metamorphosis, anatomy and classification occupy only about 50 pages of the book, the remaining 850 odd pages being devoted to a detailed consideration of the 33 orders into which he has divided the insects.

Here, the student will find some changes; for example,

the Phasmidae and Mantidae which are usually classified under the Orthoptera, are each given an order to themselves, while the Rhaphidiidae, formerly in the Neuroptera, are now also by themselves. These changes, however, are of minor consequence, and we are disarmed from criticism by the extreme clarity of arrangement and design which pervades the book. This is especially true of the keys and lists of important characters of adults, larvae, etc., arranged in columns.

We agree with the author's view expressed in his introduction that a feeling of concern and goodwill should be cultivated towards insects in general. This would help to get rid of the all too prevalent conception of the insect as a pest, generally with a capital P. We also welcome his reminder that nationalism has played an important role in maintaining systems of classification. Now is the time to try and change this old-fashioned state of things. R. N. C.

2. SILVICULTURE

2 : 23.13 : 12.19.2 (59.1) : 60.31. ALLSOP, F. **An exercise in silviculture.** *Indian For.* 68, 1942 (129–33).

A brief account of management practices in forest reserves near Rangoon in the Insein Division, particularly of regeneration markings which are carried out with the object of assisting regeneration and growth of desirable species after the purely mechanical "exploitation marking" has been completed. These forests are mainly of the lower mixed deciduous type and thus supply a considerable variety of woods. Their accessibility to Rangoon makes utilization almost complete.

21. SILVICULTURAL CHARACTERS OF TREE SPECIES

21.0. *Adaptability to the General Environment. Acclimatization*

21.0 : 12.25 (74) : 21.64. LITTLEFIELD, E. W. ***Pinus thunbergii*: a successful exotic on the north Atlantic Coast.** *J. For.* 40, 1942 (566–73). [New York State Conservation Department.]

(i) *Pinus thunbergii* Parl., the Japanese Black Pine, was introduced at Nantucket Island, Mass., and Sag Harbour, N.Y., shortly before 1900, and is now recognized as the most satisfactory species for coastal forestation and landscape planting. (ii) Experience with the species in New York has included the collection of seed from local sources, nursery propagation, experimental field tests and extensive planting in the State parkways on Long Island. (iii) In hardiness and resistance to winter injury, the tree compares favourably with the other species of Pine cultivated in the northeastern States, having withstood temperatures down to –20° F. in western New York. Trees under five years old, however, are more susceptible to winter injury and cannot be successfully planted in exposed places away from the coast. (iv) Seedlings in their first year are unusually sensitive to low temperatures, especially during the fall months, and must be mulched early if risks are to be avoided. Nursery propagation on coastal, rather than inland, sites is to be preferred. (v) The outstanding characteristic of *P. thunbergii* is its high saline tolerance, which permits it to thrive under excessive exposure to salt spray or even inundation by sea water. (vi) *P. thunbergii* is highly resistant to the European Pine shoot moth and other insect pests. (vii) Neither the form of the tree nor the technical properties of the wood are such as to place this species in competition from the utilization standpoint with the native hard Pines of North America. *From author's summary.*

21.0 : 12.25 (74.7) : 23.1. YORK, H. H., and LITTLEFIELD, E. W. **The naturalization of Scotch Pine, northeastern Oneida County, N.Y.** *J. For.* 40, 1942 (552–9). [University of Pennsylvania.]

Plantations of Scots Pine, established in central New York 60–70 years ago, have been reproducing abundantly since about 1890, and the species is now generally distributed throughout two areas totalling about nine sq. miles on sandy soils that are well suited to it. Volunteer stands of sapling size have densities up to 2,500 trees per acre. In these stands, the form of the stems is considerably better than that of trees found in the average Scots Pine plantation in this region.

21.0 : 12.25 : 23.21. SCHULTZ, E. F. El Pino del Brasil 'Pino Misionero'. Una especie maderable de porvenir para Tucumán. [***Araucaria brasiliana*: A promising timber tree species for the Province of Tucuman.**] *Circ. Estacion Experimental Agricola de Tucuman* No. 110, 1942. pp. 4. [Span.] C.G.B.

Preliminary results from an experimental plantation established by direct sowing in 1935 indicate that the species is well adapted to the climatic conditions of Tucuman. The trees have done reasonably well in spite of exceptionally unfavourable weather, including prolonged heat and drought.

21.3. *Soil Requirements*

21.3 : 12.11.12 : 11.41.5–6 : 11.47.1 : 12.14.3. BAVER, L. D. **The relation of soil factors to the growth of trees.** *Proc. nat. Shade Tree Conf.* 17, 1941 (147–9). [North Carolina Agric. Exp. Sta.]

The ability of a tree to produce a good root system and hence to utilize fully the nutrients in the soil depends largely on the nature of the soil in which it grows. Adequate drainage is necessary, and the subsoil must be friable. Owing to the slow mobility of phosphoric acid, potash and lime, it is essential that these should be applied at the level of the roots.

21.32 : 12.25. SMITH, M. E., and BAYLISS, N. S. **The necessity of zinc for *Pinus radiata*.** *Plant Physiol.* 17, 1942 (303–10). [University of Western Australia.] O.B.D.

Seedlings of *Pinus radiata* grown in zinc-free culture solutions showed deficiency symptoms in three to four months. Attempts at mycorrhizal inoculation were unsuccessful. The symptoms of zinc deficiency are described.

21.6. *Behaviour in the Stand*

21.61 : 12.14.4 : 22.2. MOBIUS, M. Versuch zur Erklärung der mehrstämmigen Bäume. **[An attempt to explain the phenomenon of trees having several stems.]** *Allg. Forst- u. Jagdztg.* 118, 1942 (172–8). [G.]

The following cases are distinguished:—*A.* Several stems originating from a common root by (1) coppicing or (2) branching at low level. The latter is typical for *Pterocarya sorbifolia* Sieb. et Zucc. and *P. caucasica* Koch; in other species it is often due to the loss of the leading shoot which is replaced by two or more lateral

shoots. *B.* Several stems originating from different roots merged into one as a result of seeds, fruits, seedlings, or cuttings being placed together by accident or through the deliberate action of man.

21.61 : 12.26–8 : 12.25 : 12.14.3 : 11.48.2. ERTELD, W. Die Birkenwurzel auf armen Sandböden. Mit vergleichsweisen Beobachtungen an der Kiefernwurzel. **[Birch roots in poor sandy soils. With comparative observations on Pine roots.]** *Z. Forst- u. Jagdw.* 74, 1942 (193–215). [G.] [Preussische Versuchsanstalt für Waldwirtschaft.]

Report of investigations on 6- to 40-year-old Birch trees growing on poor sandy soils in several localities in Prussia and of similar observations on Scots Pine and Grey Alder. The Birch possesses to a greater extent than Scots Pine the ability to develop rapidly an extensive and dense system of surface roots as well as roots penetrating the deeper layers of the soil. Thus Birch readily absorbs rainfall moisture from the top soil, while benefiting from that in the deeper soil layers. The root system of Birch is more 'plastic' than that of Scots Pine in adapting itself to difficult site conditions.

21.8. *Phenology*

21.8 : 12.14.5 : 12.11 : 11.44. BURGER, H. Blattverfärbung und Blattzersetzung. **[Autumn coloration and decomposition of leaves.]** *Schweiz. Z. Forstw.* 93, 1942 (125–8).

Notes on various tree species in different Swiss localities. Time of coloration and shedding and the sequence of colours assumed by the leaves vary with species and site conditions. Two major groups are distinguished among the trees observed:—In the one, which includes Beech, Hornbeam, Sycamore, Birch, and Larch, the leaves change their colour slowly, assuming first a yellowish tinge, then a yellow colour, and finally turning reddish to brown before being shed. The second group includes Ash, Black Alder, Grey Alder, and Elder. The leaves of these species pass from green to dark brown or black, in part just before, and in part immediately after, shedding. They are known to decompose quickly. Sessile Oak belongs to the first rather than the second group, while the opposite is probably true of English Oak. On soils with a high calcium content, autumn colouring begins earlier and leaves tend to be more yellow than on siliceous soils.

21.8 : 12.19.2 (729.7). BEARD, J. S. **The use of the term 'deciduous' as applied to forest types in Trinidad, B.W.I.** *Emp. For. J.* 21, 1942 (12–7).

On the well-drained lowland sites of Trinidad there are four formations which are described as evergreen rain forest, evergreen semi-monsoon forest, semi-evergreen semi-monsoon forest, and moist deciduous monsoon forest. Seasonal drought, which is determined by a complex of factors including rainfall, topography and soil type, varies in severity from one formation to another, being absent in the rain forest and most severe in the monsoon forest. In the same order the four types show an increasingly xerophytic appearance, a lower and more open canopy and a higher proportion of deciduousness, the degree of deciduousness being a close indicator of the drought relations of the formation and therefore useful in the classification of forest types. The percentage of deciduous and semi-deciduous trees in the upper crown is shown to vary from negligible in the rain forest to 66 in th monsoon forest and in the lower storeys from nil t 25 per cent.

21.8 : 23.27. SAGREIYA, K. P. **How to collect phen logical records for shrubs and ornamental trees.** *India For.* 68, 1942 (245–6).

A short note for the guidance of gardeners an arboriculturists interested in the keeping of such records

22. SILVICULTURAL SYSTEMS. FORMS OF STAND

22.14.1 : 22.83. DANNECKER, K. Vom Naturwald zur Plenterwald. Zum Gedenken an Leopold Hufnagl Forscherarbeit. **[From the natural to the selectio forest. In commemoration of Leopold Hufnagl's re search work.]** *Cbl. gesamte Forstw.* 68, 1942 (107–16 [G.]

An account of successful selection management sinc 1894 in the Silver Fir/Beech/Spruce mountain forest c Gotschee, Austria, which covers some 17,000 ha. an parts of which had an almost virgin character befor that date.

22.14.2 : 56.04 : 21.7. MULLOY, G. A. **Small tree reserved as growing stock.** *Silvic. Leafl. Dom. For Serv.* No. 14, 1942. pp. 2.

In Spruce stands of eastern Canada the trees 5 in and less in diameter cost more to cut and are faste growing than larger trees, and they should be reserve from cutting during pulpwood operations unless ther is danger of windthrow.

22.83 : 21 : 12.26–8 : 12.19.4. LAL, A. B. **Significanc of Teak-Sal mixture from the standpoint of plan succession.**—With comment by T. V. Dent. *Indian For.* 68, 1942 (181–7).

In the Kanker range the mixture is rare, since Tea tends to be suppressed by Sal. It is argued that this due to the silvicultural characters of Sal, including shad tolerance and relatively better growth, as well as t local site conditions, which are more favourable to Sa than to Teak.

23. FORMATION OF STANDS

23.1. *Natural Regeneration*

23.1 : 12.25 : 11.11 : 11.49.5. DUNDAS, J. C. **Note on the regeneration of species on mossland on the Fort Carse.** *Scot. For. J.* 56, 1942 (33–9).

Observations of tree growth, mainly on natural Scot Pine, in the Ochtertyre Moss which lies some 4–5 mile west of Stirling and covers an area of about 270 acres The writer gives some evidence that years of good see germination in the past may have been correlated wit high mean temperature in October.

23.1 : 12.25 : 23.13 : 22.14.2 : 32.29.2 : 23.23.11. PER SON, H. L., and HALLIN, W. **Natural restocking o Redwood cutover lands.** *J. For.* 40, 1942 (683–8) [California Forest & Range Exp. Sta.]

An extensive survey of natural reproduction o Redwood cut-over lands showed that large areas ar seriously understocked. Factors favouring natural re generation of this species on good sites are partial shade exposed mineral soil and a good seed supply. Ade quate reproduction was found on areas that had bee selectively logged with tractors, leaving a good residua stand, and where slash and litter had been effectivel removed during the logging and by controlled spo burning. Conditions on such areas appeared to b

more favourable for Redwood than for its principal associates White Fir and Douglas Fir.

23.1 : 12.25 : 65.7 : 43. PARKER, H. A. **Stocking of Lodgepole Pine after fire.** *Silvic. Leafl. Dom. For. Serv.* No. 12, 1942. pp. 2.

Sample-plot data from the Kananaskis Forest Experiment Station indicate that regeneration is practically complete within two years following a severe fire. There appears to be a relation between the age of the stand before fire and the amount of viable seed. This amount was higher in a 180-year-old stand than in either the older or younger stands that were investigated.

23.13 : 12.25 : 32.29.2. ALEKSEEV, C. V., and MOLCHANOV, A. A. **The influence on regeneration of different methods of clearing slash in the Pine forests of the Archangel region.** *Lesnoe Khozyaystvo, Moscow* 1940 (7), (26–31). [R.]

An account of investigations in a Pine/Spruce stand (ratio of Scots Pine to Spruce = 4 : 1) with Spruce/Birch undergrowth on fresh sandy soils having a cover of moss (5–6 cm. thick), *Vaccinium*, and *Rubus*. Following the felling of all trees from 31 cm. d.b.h. upwards (over 60 per cent. of the growing stock), the slash, consisting of branches shorter than 2 m., was (1) burnt in heaps, (2) stacked in heaps and left unburnt, (3) distributed evenly over the felling area, or (4) left lying *in situ*. During the following 13-year period there were three good seed years for Spruce and one for Pine. By the end of the period, Pine regeneration was found only where the slash had been burnt. Spruce regeneration was more abundant, but as yet there is no conclusive evidence as to the relative value of the different treatments, even for this species.

23.13 : 12.25 : 60.31 : 21.2 : 21.11. PEARSON, G. A. **Herbaceous vegetation a factor in natural regeneration of Ponderosa Pine in the Southwest.** *Ecol. Monogr.* 12, 1942 (315–38). [Southwestern Forest & Range Exp. Sta.]

In the Ponderosa Pine forests of the southwestern United States, grasses, which predominate on the heavier soils, offer strong competition to Pine seedlings in the initial stages of root development when moisture is required from the upper soil layers. The intensity of competition varies with the growth habits of different grasses, Arizona fescue being the most aggressive as it grows during May and June when precipitation is at a minimum. The effect of grass competition has been checked experimentally, the best survival and growth of seedlings being obtained on plots that were denuded and kept free of all competing vegetation. Soil moisture appears to be the most important factor determining different results under different treatments, while light appears to be an important secondary factor. Controlled grazing will aid Pine reproduction, but it is not advisable to allow grazing to continue to the point of denudation.

23.2 *Artificial Regeneration*

23.2 : 12.25 : 45.12 : 11.44. BRAMBLE, W. C., and GODDARD, M. K. **Effect of animal coaction and seedbed condition on regeneration of Pitch Pine in the Barrens of central Pennsylvania.** *Ecology* 23, 1942 (330–5). [Pennsylvania State College.]

The results of experiments to test the relative importance of animal coaction and seedbed conditions as environmental factors tending to prevent germination of seeds and survival of seedlings of Pitch Pine in the Scrub Oak Barrens of central Pennsylvania. In the Aspen and Scrub Oak communities animal coaction prevented the establishment of Pitch Pine from seed, while in the grass community poor seedbed conditions alone were sufficient to cause failure. The animal destruction was caused mainly by small mammals and birds. So far as was observed, no significant damage was caused by white-tailed deer in the early stages of seedling development.

23.2 : 12.26–8 : 23.23.15. WIMBUSH, S. H. **Methods of planting Wattle.** *E. Afr. agric. J.* 6, 1941 (205).

Transplanting of open-rooted natural seedlings gave very poor results as compared with sowing of treated seed. Treatment consisted in placing the seed in boiling water which was immediately removed from the fire and allowed to cool for twelve hours, after which the seed was removed and spread out to dry.

23.22. Preparatory Work. Auxiliary Measures

23.22.2 : 23.21 : 12.26–8. ALLSOP, F. **Plantations in the Twante-Kondan Reserve, Insein Division, Burma.** *Indian For.* 68, 1942 (177–81).

Cheap and successful regeneration of *Xylia dolabriformis* and other species was obtained in *taungya* plantations with guava.

23.23. Sowings

23.23.1. *Seed Procurement, Treatment, and Testing*

23.23.1 (7) : 12.14.7 : 12.11.3. BALDWIN, H. I. **Forest tree seed of the north temperate regions with special reference to North America.** Chronica Botanica Co., Waltham, Mass., U.S.A.; Wm. Dawson & Sons, Ltd., London, W.1. 1942. pp. xvi + 240. $4.75.

This is a very comprehensive survey in 240 pages of all aspects of the subject of forest tree seed in the north temperate regions. Morphology and anatomy, biochemistry and physiology are covered somewhat briefly, as is appropriate in a book intended for foresters generally, but the fullest information is given on the practical problems of seed collection, extraction, storage, testing and kindred matters. Approximately a thousand references to literature are given, many more having been consulted, and the work may be accepted as incorporating all published information on the subject as well as much that has not been published. A need for a work of this kind has long been felt, and it is rather surprising that none has been published during the period of fifteen years which the production of the one under review has taken. This need has been particularly marked with regard to information on seed extraction and standardized purity and germination tests, each of which has one or more chapters devoted to it with figures of the plant used. The important subject of provenance is dealt with in 14 pages, which give an adequate review of the present position of knowledge with all necessary references, and without excessive detail. The connected subjects of determination of origin and seed certification are also dealt with. The penultimate chapter discusses the question of tree seed research with suggestions on the layout of experiments and directions in which further work is needed, and this is followed by a useful glossary of terms.

A feature apparent throughout is the historic approach which gives additional interest to the factual matter. The author has been associated with this aspect of forestry for many years and has studied it in Europe as well as in North America.

H. G. CHAMPION.

[See also *Plant Breed. Abstr.* 13, 1943 (99).]

23.23.1. OSSOWSKI, L. **The collection and treatment of forest tree seeds.** *Scot. For. J.* 56, 1942 (43–53).

A general article discussing choice of parental trees and stands, time and methods of seed collection, and the storage and testing of seed.

23.23.1 : 07.2 : 57. ROHMEDER, E. Ergebnisse der forstlichen Saatgutforschung als Mittel zur Ertragssteigerung im Walde. **[The results of research on forest tree seed as a means of raising the yield of forests.]** *Forstarchiv* 18, 1942 (165–76). [G.] [Institut für Forstsamenkunde und Pflanzenzüchtung der Forstlichen Forschungsanstalt München.]

Review of 12 recent papers on the subject, with special reference to origin and quality of seed.

23.23.1 : 12.25. ALLEN, G. S. **Douglas Fir seed from young trees.** *J. For.* 40, 1942 (722–3). [British Columbia Forest Service.]

It is shown that quantities of fertile seed can be obtained from trees less than 20 years old provided adequate cross-pollination can be obtained. Before collecting seed from such trees it is advisable to make a cutting test of seed from sample cones to determine the percentage of filled seed. Data indicate that about 90 per cent. of the filled seed will germinate, and it is tentatively suggested that at least 60 per cent. of the seed should be filled before the stand in question is considered suitable as a source of seed. *From author's summary.*

23.23.1 : 12.26–8. ROHMEDER, E. Keimversuche mit *Ulmus montana* (With). **[Germination tests with *Ulmus montana* (With).]** *Forstwiss. Cbl.* 64, 1942 (121–35). [G.] [Institut für Forstsamenkunde und Pflanzenzüchtung in München.]

In the tests described the following data were obtained:—The germination capacity of fully matured *U. montana* seed is highest at the time of harvest and gradually decreases thereafter. Seed which is not fully matured is characterized by a germination capacity which is high at first, low during one or several months of after-ripening, and at its highest shortly after this is completed. Fully matured seed germinates much faster than seed that is immature. In the laboratory the Elm seed germinates best at a constant temperature of 25° C. or at a temperature varying between 20° C. and 30° C. in a Rodewald or a Jacobsen germinator with free access to light. Fully matured seed gives much the same germination whether it is winged or not, but seed that is not fully matured germinates much better when winged—probably due to the beneficial effect of the moisture stored in the wings. In the field, the plant percentage is higher with winged seed, even if it is fully matured. The seed should be stored dry at room temperature or at 2–10° C.; under these conditions, the germination capacity is kept sufficiently high until the spring following the harvest, but storage for another winter is not economical. Prematurely harvested seed stands storage better than fully matured seed. In natural regeneration or sowing, fully matured seed usually produces plants a few days after it touches the soil, whereas the bulk of the immature seed does not give seedlings until the following spring. It is recommended that *U. montana* seed should be harvested late in the season, preferably by collection from the ground. Sowing in forest or nursery should take place as soon as possible after seed harvest.

23.23.13 : 12.26–8 : 07.7. THORESEN, C. T. **Trailer thresher speeds up Black Locust seed extraction.** *J. For.* 40, 1942 (584–5). [Tennessee Valley Authority.]

The thresher described, operated in conjunction with a 'Clipper' seed cleaner, extracted an average of 500 lb. of clean seed per hour from approximately 450 bu. of pods, two operations being necessary to extract 95 per cent. of the total seed. An advantage over equipment previously used was a low percentage (2 per cent.) of broken seed.

23.23.15 : 12.25 : 11.33. MCLINTOCK, T. F. **Stratification as a means of improving results of direct seeding of Pines.** *J. For.* 40, 1942 (724–8). [Central States Forest Exp. Sta.]

Delayed germination has been one of the factors responsible for failures of spot-sown Pine seed on old field sites in southern Ohio. Results from the experiment described show that stratification of seed in moist granulated peat at 5° C. for 3 months improved the germination per cent. and catch for Virginia, Shortleaf and Pitch Pines, although it reduced the catch of Loblolly Pine. In practically all cases better results were obtained on north than on south slopes, both with and without stratification.

23.23.15 : 12.26–8. BANNERJEE, K. K. **An attempt on quick germination of *Tectona grandis* seeds.** *Indian For.* 68, 1942 (240–4).

The method recommended from the writer's experience is as follows:—After 36 hours soaking in a pond the seeds are spread on Bamboo mats and are watered every 12 hours or so for 3 to 4 weeks, when some 50 per cent. show signs of germination or begin to split. The seeds are then transferred to a nursery bed, the watering being continued until the break of the rains. While on the matting, seeds must be spread well apart to ensure proper drying between successive waterings.

23.23.15 : 12.26–8. HEIT, C. E. **Pretreating seed of Black Locust.** *Farm Research* 8 (2), 1942 (11, 14, 17).

Pretreatment of Black Locust and other leguminous tree and shrub seeds by immersion for one hour in a sulphuric acid bath at a temperature of 75° F. is recommended as a means of overcoming the impermeability of the seed coat and increasing germination.

23.23.15 : 12.26–8. MARRERO, J. **A seed storage study of Maga.** *Carib. For.* 3, 1942 (173–84). [E.span.] [Tropical Forest Experiment Station, Puerto Rico.]

Experiments with *Montezuma speciosissima* seed indicate that cold storage is essential for satisfactory results, and that under cold storage conditions germination varies inversely with the moisture content of the seed. However, even under the most favourable conditions, seed devitalization is rapid after two months. Reduction in moisture content does not have much effect at room temperature.

23.23.19. WACH, A. Versuche zur Selenitfärbung des forstlichen Saatgutes. **[Tests on the selenite colouring of forest seed.]** *Allg. Forst- u. Jagdztg.* 118, 1942 (178–88, 210–8). [G.g.] [Institut für Forstsamenkunde und Pflanzenzüchtung der Forstlichen Forschungsanstalt München.]

Report on tests on the mechanism of coloration by selenite of the cells of forest seed. The view that a weak solution (2 per cent.) of $NaHSeO_3$ never colours dead tissue has been fully confirmed.

23.24. Formation of Stands by Planting

23.24 (68) : 12.25 : 23.21 : 76. KING, N. L. **Tree-planting for commercial purposes.** *J. S. Afr. For. Ass.* No. 8, 1942 (37–49).

A discussion of the factors to be considered in planting trees on a commercial scale in South Africa, including species to be used, their requirements and yields, marketing of timber, cost of establishing and maintaining plantations, and the financial returns that may be expected from such undertakings.

Species of Poplar that are of greatest value in South Africa are *P. canescens* and *P. deltoides*. The wood is greatly in demand for match production and can also be used for plywood, boxes and wood wool. These species, however, require deep fertile soil where plenty of moisture is available throughout the year, and the area of their cultivation is therefore restricted.

Conifers are more suitable for large-scale planting, and experience has shown that many species can be grown to maturity in South Africa. Information is given as to site requirements, growth rate, and wood qualities and uses for the more important species of Pine being grown there. An example is given to illustrate the possible yields and financial returns from a coniferous plantation, assuming the species to be *Pinus insignis*, the area to be 1,600 acres and with certain specified conditions of site and management.

23.24 (78.9) : 01.4 : 23.25 : 23.53. **Procedure and technique for tree and shrub planting.** *Regional Bull. Soil Conserv. Ser.* No. 26, 1940. pp. 22 + 5 + dgms. (*Woodland Ser.* No. 6).

A bulletin prepared for the administrative use of the personnel of the Soil Conservation Service.

23.24 : 12.26–8 : 24. LAURIE, M. V., and GRIFFITH, A. L. **The problem of the pure Teak plantation.** *Indian For. Rec.* (*n.s.*) *Silviculture* 5, 1942. (1–121 + plates.) P.R.

This is a revision of *Indian For. Bull.* No. 78 (1932) by H. G. Champion, which has been greatly amplified and largely re-written, summarizing information received from various parts of India, Burma, Java, and from recent publications.

A number of charges have been made against pure Teak plantations. These, together with comments in the present publication on individual charges are as follows:—

1. There is undue falling-off in the growth rate and health of plantations which showed early promise. Faster growth in youth will make the later falling-off in growth more apparent if the same ultimate size is attained.

2. There is soil deterioration. In Madras there is some evidence that surface soil had been hardened and aeration decreased in Teak plantations. The very disappointing growth of young second-rotation crops here has been overcome by use of improved technique. There are sites, however, where under Teak (*a*) there appears to have been an increase in wetness, or (*b*) soils have become lateritic. In many areas there has been no reason to suspect soil deterioration.

3. There is increased soil erosion. Erosion may undoubtedly be serious when undergrowth and litter are burned.

4. Fluting of boles is more prevalent than in natural forest.

5. Epicormic branches are more prevalent. Seed of unsatisfactory origin may have been responsible for some conspicuous examples of these (4 and 5) defects.

6. Attack by beehole borer (*Xyleutes ceramica*) is worse. Severity of attack is great in regions with rainfall between 65 and 85 in. per annum. A series of studies by Scott, Atkinson, and Garthwaite indicate that attack is rather worse in plantation Teak, especially in the above regions.

7. Other forms of insect damage, including defoliation, are worse. Severe defoliation has followed destruction of undergrowth by burning.

8. *Loranthus* attack is worse. The amount of *Loranthus* in plantations apparently varies greatly with the region.

9. There have been difficulties in replanting felled plantations. Intensive utilization, including lop and top, leaves little material to burn, but with recent technique burning has proved less essential.

10. Timber produced is of inferior quality, being lighter in colour, knotted, and liable to split at ends. Very fast grown (less than about 6 rings per inch of radius) timber is weak (as is also timber with more than about 15 rings per inch), but there is evidence that timber of similar growth rate is of similar strength, whether from plantation or natural forest.

There is a summary of views expressed on each of these points by the silviculturists of the various Indian Provinces, and of other evidence available, together with some theoretical discussion, usually brief. In most cases the charge is considered 'not proven', except for Nos. 6, 7 and 8, which are accepted as justified, but very little other than subjective observations are usually available as evidence. In general, it is argued that if plantations do in fact suffer from any of the above defects, the effect is so small as to be more than compensated by the value of the pure Teak.

Faulty planting technique and underthinning have been at least partially responsible for some of the above charges (1, 2, 4, 5 9, 10).

Pre-monsoon stump planting, with intensive weeding during the period of establishment should be practised. Thinning should begin early and be repeated almost as soon as the crowns close after the previous thinning.

It is questioned whether admixture with other species would remedy most of the alleged defects, but the desirability of an understorey to prevent soil deterioration and erosion, possibly to assist in control of insect pests, and to supply material for a burn prior to replanting, is accepted. A number of features in plantation practice, as intensive weeding during *taungya* cultivation and during establishment of Teak, spacing of 6 ft. × 6 ft., and former under-thinning, have caused many plantations to be devoid of understorey.

Methods of forming mixtures are described. The planting of Teak in patches or in lines cleared out of standing forest, or amongst the coppice regrowth of a clear-felled stand has met with varied success. Javan and Indian experience with mixtures where all species were planted, has on the whole been unsatisfactory; there have been no obvious advantages, while in some cases the form of Teak has been spoiled. 'In general throughout India, Burma and Java the retention of a natural underwood . . . is universally favoured, though

often without definite evidence of the benefits conferred, or of any reduction of increment that may have been caused by unsuitable species'. There is usually no difficulty in obtaining such an understorey; planted understories have been successfully introduced experimentally, though the procedure is expensive. The best and cleanest natural Teak timber is produced where there is dense Bamboo undergrowth, and consequently there have been several trials with artificially established Bamboo understoreys. *Tephrosia candida*, *Leucaena glauca* and other species have also been used as cover crops, but with these, as with various forms of understorey, evidence of beneficial effect is very scanty.

In appendices are:—

(i) A note by C. F. C. Beeson discussing the role of the understorey in biological control of insect pests, and suggesting plant species which should encourage predators on the defoliators of Teak.

(ii) A translation of the author's summary of 'Mixed Teak Plantations' by H. M. J. Hart in *Meded. Proefst. Boschwezen*, No. 24, Vols. I and II, 1931.

(iii) An annotated list of all species which have been used experimentally in mixture with Teak.

E. W. J.

23.24 : 21.64 : 64 : 23.21 : 12.25 : 12.26–8. GIBBS, J. A., and LIGON, W. S. **Correlation of sites and species in tree planting.** *Abstr.* in *Proc. Soil Sci. Soc. Amer. 1941* 6, 1942 (413). [Soil Conservation Service.] H.S.B.

Exceptions to the general success of a number of Pine species on a wide range of site conditions in the Ohio Valley Region include the failure of Red Pine in northern Indiana on sites having calcareous till layers at or near the surface, and the poor growth of White Pine on many sites.

The site range of Black Locust appears to be much narrower than it was thought to be previously. While a calcareous influence in the soil is not always necessary for good Locust growth, practically no failures occur when it is present; otherwise failures are much more numerous.

On eroded lands plantings of the more common hardwoods (Walnut, Tulip, Poplar, Ash, Oaks and others), whether from seed or seedlings, have not been successful. Elaborate site treatments have been found to be of little or no value. Indicator plants have proved of value in site analysis in many instances.

23.24 : 56 : 12.25. HART, ST. G. **Experimental planting of conifers, Lake Coleridge.** *J. roy. N.Z. Inst. Hort.* II (4), 1942 (77–80). L.S.

The plantations, established in 1933, are on light, rather shallow loam on a subsoil of light clay overlying shingle conglomerate. A number of Pines are doing well, but *P. radiata* shows the fastest growth, and this species together with *P. ponderosa* is outstanding for commercial planting. Douglas Fir shows rapid growth if protected from north-west winds.

23.24.1. *Planting Material*

23.24.1 : 12.25. STEVENSON, D. D. **Field survival of graded coniferous planting stock.** *Res. Pap. Pa. St. For. Sch.* No. 2, 1941. pp. 3. [Pennsylvania Agric. Exp. Sta.]

Nursery stock of Red Pine and other conifers was graded first on the basis of good or poor tops and secondly on the basis of good, medium or poor root systems, giving six classes in all. The stock was planted under experimental conditions, and after five years the Red Pine showed a definite positive correlation between quality of top and survival and, somewhat less marked, between quality of root system and survival. Survival per cent. for the other conifers showed similar trends.

23.24.1 : 12.26–8 : 44.3. NEBRASKA. **Fifty-fourth annual report of the Agricultural Experiment Station.** University of Nebraska College of Agriculture, Lincoln. 1941. pp. 78. A.P.B.

Greenhouse studies on the damping-off of broadleaf seedlings were continued, emphasis being placed on biological control through the use of rotation crops and soil amendments. Tests were made of outside storage of broadleaf stock in heel-in beds of sand and loam, and of artificial freezing of broadleaf seedlings of various species (pp. 28–9).

23.24.2. *Methods of Planting*

23.24.2 : 12.25 : 21.64 : 23.3 : 57. WILDE, S. A., and ALBERT, A. R. **Effect of planting methods on survival and growth of plantations on well-drained sandy soils of central Wisconsin.** *J. For.* 40, 1942 (560–2). [Wisconsin Agricultural Exp. Sta.]

Jack and Red Pine seedlings were planted in shallow furrows, deep furrows, on top of the furrow slice, in slits without scalping, and in holes using spade and additional humus soil. The highest average survival and best height growth for both species was observed in furrows, planting in deep furrows giving somewhat better results than in shallow furrows. Slit planting gave the poorest results. Careful and expensive spade planting failed to produce results better than those obtained by any other method except slit planting. No significant difference was observed in survival or in rate of growth in furrows ploughed in different directions.

23.24.2 : 12.26–8 (729.5). ORAMAS, J. M. **Planting with tar-paper pots on difficult sites in Puerto Rico.** *Carib. For.* 3, 1942 (158–63). [E.span.]

An account of experience with tar-paper-pot planting of *Swietenia mahagoni* in Puerto Rico on dry sites. The additional cost of raising seedlings in tar-paper pots is offset by the increase in survival and by more efficient planting when using partially trained crews. Seedlings are either raised in the pots from seed or transplanted into the pots when they are one month old.

23.26. Plant Rearing. Nursery Practice

23.26 : 12.25. REINEKE, L. H. **Effect of stocking and seed on nursery development of Eastern White Pine seedlings.** *J. For.* 40, 1942 (577–8). [Northeastern Forest Exp. Sta.]

One lot of large seed and a second lot of normal-sized seed of White Pine were sown in seedbeds at 'dense' (8 oz. per bed) and 'light' (4 oz. per bed) rates and grown for two years. Results show that density of stocking materially modifies the seedbed development of Eastern White Pine seedlings, with the seed itself influencing the magnitude of the modification. Significant increases due to decreased density of seedlings were recorded for diameter and height of stem and tap root, and for aggregate length and number of lateral roots. Significant differences due to seed are noted for the number of terminal buds and lateral roots.

23.26.1 : 23.24.1 : 12.26–8 : 23.23.11 : 45.3. GRIFFITH. A. L. **Stump production in Madras Teak nurseries,**

Indian For. Rec. (*n.s.*) *Silviculture* 4, 1942 (i–iii, 225–57 + plates). P.R.

Experiments in areas having a general west-coast type of climate show that in order to get the highest production of stumps of the best size with the most economical use of seed, $\frac{1}{8}$–$\frac{1}{6}$ lb. of seed should be sown per sq. ft. of nursery bed and no pricking out of seedlings done. One standard 40 ft. × 4 ft. nursery bed thus sown will produce, on the average, enough good stumps to plant 1 acre at 6 ft. × 6 ft. espacement and still leave a reserve for casualty replacement.

It has been found that poor Teak seed years occur fairly frequently. Under-sized material that is normally thrown away can be used when there is a shortage of plants for stump planting. It isn't desirable to use large central nurseries for Teak because repeated cropping caused serious falling off in stump production in a few years, and, in addition, serious attacks by cock chafer and white ants occurred in 2 of the 5 years of the long-term nursery experiments. *From author's summary.*

23.26.3 : 12.26–8. KURAISHY, J. A. **Transplanting of Sal in Tilkonia Range, Gorakhpur Division.** *Indian For.* 68, 1942 (208–9 + plate).

Sal seedlings about 6 weeks old were transplanted successfully on a large scale to fill gaps where coppice regeneration had failed.

23.27. Arboriculture

23.27 : 42 : 44 : 45. MARSHALL, R. P. **Care of damaged shade trees.** *Fmrs'. Bull. U.S. Dep. Agric.* No. 1896, 1942. pp. 34.

The subject is dealt with under the following main headings:—(1) causes of wounds and how they may be avoided; (2) wound healing; (3) wound treatment; (4) cases requiring special handling; (5) supplementary preventatives and repairs.

23.27 : 47. COOK, C. **Some aspects of tree surgery in Canada.** *Ann. appl. Biol.* 29, 1942 (205–8). R.A.M. 21 (433).

Includes an outline of a tree surgeon's work and gives methods of climbing trees, pruning, cabling, filling cavities and spraying against pests and diseases.

23.3. *Afforestation*

23.3 : 96.5 (43.1–5). HARTGEN, V. Untersuchungen über die Entwicklung der Aufforstung im nordwestsächsischen Braunkohlengebiet unter Berücksichtigung eines Waldgürtels für Leipzig. **[Investigations on the development of afforestation in the brown-coal region of northwest Saxony, including the establishment of a forest belt round Leipzig.]** *Thar. forstl. Jb.* 93, 1942 (252–88). [G.]

Problems connected with the afforestation of some 250 ha. of waste heaps and tips in the brown-coal region around Leipzig are discussed. Species employed include Grey Alder and *Robinia.* The work is very costly.

23.6. *Care of Regeneration in the Initial Stage of Establishment*

23.6 : 12.26–8 : 44.1 : 97.3 : 34.21. ROWNTREE, J. B. **Note on controlled grazing in Kamrup Division.** *Indian For.* 68, 1942 (312–15).

Excessive growth of coarse thatch (*Imperata cylindricum*), which tends to suppress Sal regeneration, is reduced at reasonable cost by controlled grazing. The thatch is made palatable to cattle by treatment with salt.

24. TENDING OF STANDS AND TREES

24 : 23.1 : 22.83 : 12.26–8 : 07.7. TRYON, H. H., and FINN, R. F. **Improvement cuttings in mixed hardwoods.** *Black Rock For. Pap.* 1, 1942 (120–6).

Good natural reproduction can usually be obtained by two light thinnings, each yielding not more than 5–6 cords per acre. The thinning should be made in good mast years. Initial selective weedings should be withheld for at least 4 or 5 seasons after the first thinning in the overwood. Pruning may be done during the final weeding, but then only with reference to the best crop trees. The most suitable tool for selective weeding is the 18-inch machete.

24 : 44.3 : 45.3 : 12.19.2 (77). **Report of the Committee on the relation of cutting practices to prevention of damage to forests by insects and diseases.** Wisconsin–Upper Michigan Section, Society of American Foresters, Wisconsin. [1941?] pp. 7.

With reference to the major forest types occurring in the Lake States.

24.1. *Cleanings*

24.1 : 22.2 : 12.26–8. BEDNALL, B. H. **Jarrah coppice cleaning.—A report on experimental work in Jarrah (*Eucalyptus marginata*) coppice, nine years old in 1941.** *Aust. For.* 6, 1942 (104–11).

Thinning to one or two dominant shoots per stump at the age of 3 or 4 years did not improve either height or diameter growth, nor did it influence the extent of forking. An adequate natural reduction in the number of competing stems had taken place in the unthinned controls by the time the coppice was 9 years old.

24.2. *Thinnings*

24.25 : 56.2 : 56.04–05 : 12.26–8. SHUSTOV, B. A. **The influence of thinnings on the productivity and quality of stands.** *Lesnoe Khozyaystvo, Moscow* 1940 (7), (19–26). [R.]

Data obtained in investigations on Oak and Hornbeam stands of different ages ranging from about 20 to 60 years indicate that the heavy thinning of such stands tends to increase the increment and to improve the stem form. The removal of 40–45 per cent. of the growing stock in a heavy thinning resulted in an increase in volume increment of 17 to 63 per cent. in from four to ten years as compared with control stands from which only dead material had been removed. Light thinning, involving the removal of some 7–18 per cent. of the growing stock, also stimulated the increment, though less effectively than heavy thinning. It is noted that similar results had been obtained by Mikheev working with Pine stands. Sample measurements showed that a large proportion of trees in the heavily thinned stands had put on more increment at half height than at breast height. This is in agreement with results previously obtained by Davÿdov with Spruce and by Zhukov with Pine and mixed hardwoods.

24.3. *Opening of the Canopy. Release and Improvement Fellings*

24.3 : 22.83.2 (71.4). MULLOY, G. A. **Improvement cuttings: Intolerant hardwood-conifer type.** *Silvic. Res. Note Dom. For. Serv.* No. 68, 1941. pp. 26. [Dominion Forest Service, Ottawa.]

A forest type that extends over large areas in eastern Canada and that becomes established on many different site-types following the burning of the original forest, consists of an overstorey of Poplar (*P. tremuloides* and *P. grandidentata*) and White Birch with an understorey of Spruce and Balsam Fir. From the experiment described in this *Research Note* it is shown that the removal of part or all of the hardwood overstorey (at 35 years old) did not increase the height growth of the coniferous understorey during the twelve years following the cutting. During this period the tolerant hardwood stand on undisturbed areas continued to increase its density, as shown by figures for basal area, and it is apparent that succession to the climax type, which in this case is the Yellow Birch/Balsam/Spruce type, will be slow.

24.3 : 23.25 : 44.3 : 12.26–8 (74). CAMPBELL, W. A., and SPAULDING, P. **Stand improvement of northern hardwoods in relation to diseases in the northeast.** *Occ. Pap. Allegh. For. Exp. Sta.* No. 5, 1942. pp. 25 + plates. P.R.

Stand improvement can be carried out with most success in young stands on good sites. Stands on poor sites are often inherently susceptible to canker and decay. The eradication of cankers is at present an economic impossibility, but the larger cankered trees should generally be felled in stand-improvement operations and the cankered sections used as firewood. The majority of canker infections originate before the stand is 25 years old. Wood rots, on the other hand, increase in frequency with the age of the stand. Both can be avoided to some extent by the prevention of wounds which allow the entrance of wood-rotting fungi.

In the selection of potential crop trees, seedlings and seedling sprouts should be given preference over stump sprouts which are usually infected by decay from the parent stump. The removal of unwanted stems, resulting in wounds more than 3 inches in diameter, substantially reduces the value of a sprout as a potential crop tree.

Various canker diseases and wood rots are listed and described.

24.3 : 76.3 : 21.6. CONDIT, G. R., HUBERMAN, M. A., and MCGUIRE, J. R. **Collect the bounty on your wolf-trees.** *J. For.* 40, 1942 (680–2). [Northeastern Forest Exp. Sta.]

The harmful effect of wolf-trees in monopolizing space and retarding stand development was brought out in a recent study made in White Pine plantations in southwestern Maine. It is concluded that with the present strong demand for boxboard logs and fuelwood, woodlot improvement through the removal of wolf-trees can be undertaken at a profit.

24.31 : 12.25. STARKER, T. J. **Will girdling always kill Douglas Fir?** *J. For.* 40, 1942 (658–9). [Oregon State College.]

Instances are reported of Douglas Fir and of Oregon Oak (*Quercus garryana*) and Pacific Madrone (*Arbutus menzesii*) remaining alive for several years after thorough girdling. Two Douglas Firs that were axe-girdled with a cut 4 in. wide and deep enough to sever bark and sapwood were living after 13 years. It is suggested that the portion of the tree below the girdle is supplied with food from an adjoining live tree by means of a root graft. Experimental results indicate that girdling of Douglas Fir gives the best results when done in April and May.

24.31 : 24.1 : 22.83. TRYON, H. H., and FINN, R. F. **Tests of chemical control of hardwood sprouts.** *Black Rock For. Pap.* 1, 1942 (112–3).

Complete hacking or ringing of stumps followed by an application of calcium chlorate solution or ammonium thiocyanate solution was effective in preventing the growth of competing hardwood sprouts in a mixed coniferous/hardwood forest. The cost of this treatment was less than that of annual or even biennial machete treatments.

24.4. *Shelterbelts. Windbreaks*

24.4 : 96.1. WYOMING. **Practical results from the state experiment farms.** *Bull. Univ. Wyoming agric. Exp. Sta.* No. 243, 1941. pp. 43. A.P.B.

The yield of crested wheat grass hay, in the dry year of 1938, grown on land protected on the north side by a single row of trees approximately 18 ft. high, was double that grown 150 ft. further away from windbreak protection.

24.5. *Pruning*

24.5 : 23.27. FELT, E. P. **Pruning trees and shrubs.** Orange Judd Publishing Company, Inc., New York. 1941. pp. 237. [Bartlett Tree Research Laboratories.]

This book presents in concise form and non-technical language the more important matters relating to the pruning of trees and shrubs grown for shade, ornament, and small-scale fruit production, with special reference to the requirements of growers in the northeastern United States.

3. FOREST UTILIZATION. FOREST TECHNOLOGY

3 (43.1–5). KOLLMANN, F. Holzforschung und neuzeitliche Holzverwertung in Deutschland. [**Wood research and modern wood utilization in Germany.**] *Holz* 5, 1942 (1–10). [G.] P.R.

A general account of developments that have taken place in timber research, and a discussion of the equipment required for modern wood-research institutes and of related problems of finance.

31. PROPERTIES AND ANATOMY OF WOOD

31.0. *General Information on Woods*

31.0. *Timber Leaflets* Nos. 22, 30, 36, 42, 47, 64–74. Timber Development Association, Ltd., 75, Cannon Street, London, E.C.4. 1942.

Additions to the series noted in *For. Abs.* 4 (30).

31.0 (54) : 12.25 : 12.26–8 : 31.27 : 33.8. LIMAYE, V. D. **Note on Indian timbers for aircraft and gliders.** *Indian For. Rec. (n.s.) Utilization* 2, 1942 (168–77). [Forest Research Institute, Dehra Dun.]

Brief notes on species suitable for aircraft construction, indicating their distribution, availability and strength properties. Indian Spruce (*Picea morinda*) and Fir (*Abies pindrow*) are similar to Sitka Spruce as regards strength and weight and are suitable for parts of the framework where only high-quality timber is permitted. The light hardwoods *Michelia excelsa*, *M. champaca* and *Polyalthia fragrans* are also suitable for this purpose, and *Canarium euphyllum* and *Phoebe goalparensis* are promising species. For aircraft plywood, *Dichopsis elliptica*, *Zanthoxylum rhetsa*, *Dalbergia latifolia*, *D. sissoo* and *Mangifera indica* are

suitable, and *Phoebe goalparensis*, an excellent plywood timber, should be tested for this purpose. *Pterocarpus dalbergioides* has proved satisfactory for use in air-screws, and *Dalbergia sissoo* and *Phoebe goalparensis* should also be suitable. Teak would do if used with synthetic resin glues. Only a small percentage of timber from any one tree can pass the strict specifications required. Specifications for the selection of Indian Spruce for aircraft construction, based on extensive tests made at the Forest Research Institute, are listed.

31.0 (69.9) : 12.26–8 : 31.41 : 33.36.1. CLEMENTS, J. B. **Nyasaland indigenous timbers.** *Repr.* from *Nyasald. agric. quart. J.* 2 (3), 1942. pp. 14.

Includes a brief discussion of methods for increasing the durability of timbers and so preventing or reducing damage by borers and fungi. Notes are given on the physical properties, working qualities and uses of a number of fairly durable timbers, indigenous to Nyasaland, many of which are of value for building and structural work.

31.0 (86). ACOSTA SOLIS, M. Maderas más conocidas y usadas en la Prov. de Esmeraldas (Ecuador). [**The better-known and commonly used timbers in the Esmeraldas Province (Ecuador).**] *Maderil* 14 (167; 168), 1942, (13–16; 11–16); 15 (169), 1942 (11–16). [Span.span.]

One hundred and fifteen timbers, many as yet unidentified, are listed according to their properties and uses. The forest resources of the Province are considerable but as yet undeveloped.

31.0 : 12.25 : 33.91 : 33.4. **The uses, sizes and grades of White Fir (*Abies concolor* and *Abies grandis*).** *Pamphl. Western Pine Ass.* No. 5, 1940. pp. 8.

31.0 : 12.25 : 33.91 : 33.4. **The uses, sizes and grades of Idaho (genuine) White Pine (*Pinus monticola*).** *Pamphl. Western Pine Ass.* No. 8, 1940. pp. 19.

31.0 : 12.26–8. **The properties of Australian timbers: Coast Grey Box (*Eucalyptus bosistoana* F. v. M.).** *Mon. News Lett. Div. For. Prod. Aust.* No. 124, 1942 (5).

31.0 : 12.26–8. **The properties of Australian timbers: Southern Blue Gum (*Eucalyptus globulus* Labill. and *E. bicostata* Maid, Blakely & Simmonds.)** *Mon. News Lett. Div. For. Prod. Aust.* No. 125, 1942 (5–6).

31.0 : 12.26–8. **The properties of Australian timbers: White Beech (*Gmelina leichhardtii* F. v. M., *G. fasciculiflora* F. v. M., and *G. macrophylla* Benth.)** *Mon. News Lett. Div. For. Prod. Aust.* No. 126, 1942 (5).

31.0 : 12.26–8 : 2 : 33.36.3 : 33.91 : 31.4 : 98.3. ORELLANA, R. La balsa: árbol de la floresta ecuatoriana. [**Balsa: a forest tree of Ecuador.**] Sucursal Mayor del Banco Hipotecario del Ecuador, Quito. 1942. pp. 23 + 12 figs. [Span.] *Trop. Woods*, No. 71, 1942 (38).

An illustrated account of Balsa (*Ochroma* spp.) under the headings:—Historical notes on the wood; regions of production; economic importance; characteristics and uses; botanical features; conditions affecting growth of the trees—climate, soil, planting, cultivation, 'macho' and 'hembra' kinds, associated plants, felling; seasoning the lumber; commercial grading; enemies and defects; statistics of exports; cost of reforestation; and laws for conservation of Balsa and kapok.

31.0 : 31.8 : 55. VOLKERT. Das Schilfern der Kiefer. Untersuchungen über den Einfluss des Baumalters auf die Holzeigenschaften. [**Splits in the heartwood of Pine. Investigations on the influence of the age of trees on wood properties.**] *Mitt. Forstwirtsch. u. Forstwiss.* 11, 1940 (173–210). [G.] *Abstr.* in *Holz* 4, 1941 (437). [G.] P.R.

Pronounced radial splits in the heartwood is a phenomenon of especially frequent occurrence in old Scots Pine trees in southern East Prussia, but it has also been observed in Pines in other regions and in Larch, Silver Fir, and Spruce. The splits are broadest near the pith and become narrower towards the sapwood. They occur in the lower 10 m. of the stem and are most frequent at about 4–5 m. height. The splits are largely confined to trees with narrow and uniform annual rings. Those at 4–5 m. height tend to run at right angles to the direction in which the crown leans. It is thought that the splits are caused by tensions brought about in the course of growth, together with mechanical stresses due to oblique growth and the leaning of the crown.

31.0 : 33.8. **Printers' blocks.** *Mon. News Lett. Div. For. Prod. Aust.* No. 124, 1942 (1–2).

Qualities required in a solid timber to be used in backing zinc and copper plates are noted, and Australian species that may be suitable for this purpose are suggested.

31.1. *Structure. Anatomy. Identification*

31.1 : 12.26–8. HEIMSCH, G. **Comparative anatomy of the secondary xylem in the 'Gruinales' and 'Terebinthales' of Wettstein with reference to taxonomic grouping.** *Repr.* from *Lilloa* 8, 1942 (83–198 + plates). P.R.

The Burseraceae, Meliaceae, Sapindaceae, Rutaceae, Simarubaceae and Anacardiaceae constitute on the basis of their wood structure a phyletic complex. In Engler's classification these are distributed between the Geraniales and Sapindales, whereas Wettstein and Hutchinson group them together in their Terebinthales and Pinnatae respectively; Hallier's Terebinthinae includes all these families except the Sapindaceae and excludes many smaller families of disputed affinities.

Another group of families, centred round the Linaceae and Humiriaceae, and including the Erythroxylaceae, Polygalaceae, Tremandraceae, Trigoniaceae, Zygophyllaceae, Malpighiaceae and Vochysiaceae differs markedly in wood structure from those families that have predominantly pinnately compound leaves. The grouping of these families is unsatisfactory in Engler's, Wettstein's and Hutchinson's systems, but that of Hallier is more adequate in that most of them are included in the Polygalinae, which he derives, along with other groups, from the Linaceae in his broad sense, containing the Humiriaceae, Erythroxylaceae and numerous other genera and families.

The xylem of the woody members of the Geraniaceae and Oxalidaceae, families composed principally of herbaceous forms, gives no indication that these families are close to the Linaceae and related families. *From author's summary.*

31.1 : 12.26–8. TIPPO, O. **A list of diagnostic characteristics for descriptions of dicotyledonous woods.** *Trans. Illinois Acad. Sci.* 34, 1941. *Trop. Woods* No. 71, 1942 (39).

The list includes the important phylogenetic features as well as those whose phyletic value is not yet established, but which have proven to be of taxonomic importance.

31.2. *Physical Properties*

31.2 : 12.25 : 33.15. HERMANN, A. **Report of comparative properties of Ponderosa Pine and pressed steel ironing boards.** *Res. Lab. Note Western Pine Ass.* No. 18, 1941. pp. 4 + gph.

In comparison with steel ironing boards, Ponderosa Pine boards are lighter and cheaper, have a higher bending strength, and involve a lower consumption of electric current.

31.2 : 12.26–8. RECORD, S. J. **Note on the wood of *Macroule*.** *Trop. Woods* No. 71, 1942 (32–3).

A brief description of the wood, which may be suitable for furniture.

31.2 : 12.26–8 : 12.19 : 31.0 : 33.0 : 33.36.3. SCOTT, M. H. **The properties and uses of South African Kiaat (*Pterocarpus angolensis*) timber.** *J. S. Afr. For. Ass.* No. 7, 1941 (61–6).

Notes are given on the distribution and size, conversion and yield, seasoning, properties, structure, working qualities, uses and method of finishing for this timber. The supply in South Africa is limited mainly to the Pilgrim's Rest District of the Transvaal Lowveld while it occurs fairly abundantly in parts of Rhodesia and in Portuguese East Africa. Logs vary in length and diameter from 20 ft. and 30 in., respectively, from East Africa to an average of about 7 ft. and 13 in. from South Africa.

The timber has a particularly attractive figure and markings and good working qualities. It is primarily a cabinet wood but is also suitable for all sorts of high-grade joinery, panelling, framing and decorative work, and its hardness makes it suitable for flooring. Its equilibrium moisture content (7·4 per cent.) is the lowest and least variable of any of the marketable South-African-grown species. Its weight at 12 per cent. moisture content averages 41 lb. per cu. ft. although the timber from Rhodesia weighs somewhat less. The heartwood is extremely durable and resistant to termites.

31.21. Texture

31.21.4 : 31.23. NARAYANAMURTI, D., and RANGANATHAN, V. **The thermal conductivity of Indian timbers. Part 1.—Variation of conductivity with density in the air-dry condition at ordinary temperature.** *Indian For. Rec. (n.s.) Utilisation* 2, 1942 (150–67). [Forest Research Institute, Dehra Dun.] P.R.

Accurate data on the thermal conductivity of 56 species of Indian timbers, varying in density from 265 kg./m.^{3} to 1,310 kg./m.^{3} in the air-dry condition at about 20° C., are reported. The influence of convection and radiation on the conductivity of wood is discussed and the results compared with those of other investigators. *From authors' summary.*

31.22. Relation to Water, Air, Gases

31.22.1 : 07.7. **New moisture meter: Wood-moisture determination by direct reading meter.** *Sth. Lumberm.* 165 (2072), 1942 (55).

Note on the pin-type electrode meter developed by Industrial Instruments Inc., Jersey City, N.J.

31.22.1 : 07.7. **Correction for electrical moisture meters when testing thick stock.** *Aust. Timb. J.* 8, 1942 (740). [Division of Forest Products, C.S.I.R.]

Note on the corrections required with timber thicker than 1 in. when using the blade electrodes supplied with most Australian electrical moisture meters.

31.22.2. HARRAR, E. S. **Some physical properties of modern cabinet woods—III. Directional and volume shrinkage.** *Trop. Woods* No. 71, 1942 (26–32). [School of Forestry, Duke University.]

Includes a tabular statement showing longitudinal, radial, tangential, and volume shrinkage for over 80 modern cabinet woods. The values give shrinkages from green to oven-dry condition in per cent. of the green dimensions.

31.22.3 : 31.1 : 33.3. ANDERSON, B. E., GORTNER, R. A., and SCHMITZ, H. **Factors affecting the decreasing rate of flow of liquids through wood.** *Tech. Bull. Minn. agric. Exp. Sta.* No. 146, 1941. pp. 70.

Attention is drawn to the well known experimental observation that the rate of flow of liquids through wood sections decreases with time.

In Part I of the *Bulletin*, experiments are described in which the electro kinetic 'zeta' potential (the potential difference between the wall and liquid in a capillary) is measured on wood during liquid flow. These show that the 'zeta' potential does not provide an adequate explanation of decreasing rate of flow. In Part II several other possible explanations are examined experimentally on both wood and other materials.

It is finally suggested that the cause of decreased flow through cellulosic filter materials is due to a pivoting action whereby the fibrous units assume positions which offer greater resistance to flow and that probably the same mechanism is active in the case of wood. Electro-kinetic changes, swelling, plugging by particles, blocking by air and pit aspiration are not regarded as important factors.

31.27. Mechanical Strength

31.27 : 12.25 (67.6) : 31.23 : 56.02. WIMBUSH, S. H. **Cypress timber tests.** *Res. Bull. For. Dep. Kenya* No. 19, [1942?]. pp. 2.

A summary is given of results from tests on material from 29 butt logs of *Cupressus lusitanica* and *C. macrocarpa*, the trees varying in age from 11 to 23 years. Average growth of the logs varied from 0·46 in. to 1·37 in. diameter per year; weight at 12 per cent. moisture content varied from 24·5 to 32·3 lb. per cu. ft., the average being 27·8 lb.; strength (equivalent fibre stress at maximum load) varied from 6,709 lb. to 11,290 lb. per sq. in., the average being 8,576 lb.

31.27 : 12.25 : 23.23.1 (43.1–5 : 52). GABER, E. Untersuchungen an Lärchenholz aus deutschem und japanischem Samen. **[Investigations on Larch wood from German and Japanese seed.]** *Allg. Forst- u. Jagdztg.* 118, 1942 (255–61). [G.]

From the tests described it appears that, so far as strength properties of timber are concerned, (1) old European Larch trees grown in Baden are 20–30 per cent. superior to old Baden Spruce; (2) European Larch is up to 20 per cent. superior to Japanese Larch, both grown in Germany; (3) both German and Japanese Larch vary according to the forest district in which the trees are grown; (4) old German Larch trees are superior to young trees.

31.27 : 12.26–8. PANSHIN, A. J. **Strength properties of Chinese Elm.** *J. For.* 40, 1942 (564–5). [Michigan State College.]

Strength tests were made on blocks free from defects,

with growth rings averaging 2–2½ per in., that were taken from a tree 19 in. d.b.h. and 70 ft. high 24 years after it was planted. Test data are recorded and strength values for Chinese Elm (*Ulmus pumila*) are compared with those of the three American species of Elm. It is concluded that as regards strength properties, fast-growing Chinese Elm is equal to American Elm (*U. americana*) and Slippery Elm (*U. fulva*), except in static bending, where it is noticeably inferior to the native species in stiffness.

31.27 : 12.26–8 (54) : 33.8. LIMAYE, V. D. **Interim report on the suitability of some Indian species for aircraft construction. *Michelia* species (*champ*).** *Indian For. Leafl.* (*Utilisation*). No. 17, 1942. pp.3. [Forest Research Institute, Dehra Dun.] P.R.

This leaflet records the results of tests on five species of *Michelia*, all Indian species of which produce soft, straight-grained, light timber, which is only slightly heavier than Spruce and compares very favourably with it in strength. It is concluded that these woods are suitable as substitutes for Sitka Spruce in the manufacture of aircraft.

31.27 : 31.23 : 12.25 (68). TURNBULL, J. M. **The relationship between modulus of rupture and weight in South African grown Pine timber.** *J. S. Afr. For. Ass.* No. 7, 1941 (67–77). [Forest Products Institute, Pretoria West.]

Using data from tests, chiefly on *Pinus teocote*, it was determined that the ratio—modulus of rupture in lb. per sq. in./spec. gravity (at 12 per cent. moisture content)^x—is approximately constant if $x = 1{\cdot}22$ or is rounded off for convenience to 1·25. Analysis of the individual differences between observed and computed values for 232 specimens showed that in 75 per cent. the differences did not exceed 10 per cent. and that the maximum difference was 26 per cent. It is concluded that the modulus of rupture can be measured more accurately and more conveniently by means of specific gravity tests than by actual strength tests, owing to the difficulty of obtaining perfect test material for the latter. The tests were limited to small stems containing no heartwood.

31.28. Working Qualities

31.28 : 31.25. PERELYGIN, L. M. **Hardness according to Brinell's method as an indicator of wood quality.** *Vestnik Inzhenerov i Tekhnikov* 17, 1941 (33–7). [R.] *Abstr.* in *Holz* 5, 1942 (92). [G.] P.R.

One of the disadvantages of the Brinell test is that when the diameter of the ball is small, unevenness in the composition of the wood may lead to faulty conclusions. Tests on Larch, Birch, Ash, Silver Fir, and Scots Pine timber showed that density [Rohwichte] gives a better indication of quality than the Brinell test. Nevertheless, given a ball diameter of 25 mm., the latter is a reliable test. The water content of the specimen need not be determined, since the result of the test is little affected by it.

31.4. *Durability. Decomposition*

31.4 : 12.26–8 : 12.25. HUNT, G. M. **Factors that influence the decay of untreated wood in service and comparative decay resistance of different species.** Forest Products Laboratory, Madison, Wis. *Mimeo.* No. *R*68, (revised ed.) 1941. pp. 5.

Includes a discussion of the relative importance of various factors that influence decay, such as temperature, humidity, natural resistance to decay and service conditions. The heartwood of the following trees is classed as durable, even under conditions that favour decay:—Catalpas, most Cedars, Chestnut, Bald Cypress, Junipers, Black Locust, Red Mulberry, Osage Orange, Redwood, Black Walnut, and Pacific Yew. The heartwood of Aspens, American Basswood, Cottonwood, the true Firs and the Willows is classed as low in decay resistance.

31.41. Natural Durability

31.41 : 31.25 : 31.43 : 33.53 : 13.2. MOLL, F. Das Verhalten ungeschützter Hölzer gegen die Bohrmuschel. **[The behaviour of unprotected timber towards *Pholas*.]** *Kolonialforstl. Mitt.* 3, 1940 (288–302). [G.] *Abstr.* in *Forstarchiv* 18, 1942 (154). [G.]

The observations described indicate that resistance to attack by *Pholas* increases with the hardness of the timber. Greenheart, *Guaiacum*, and some Eucalypts (e.g. Jarrah) were among the timbers showing highest resistance.

31.42. Attack by Plant Organisms

31.42.1 : 31.27 : 12.25 : 12.21. CHIDESTER, M. S. **The effect of a mold, *Trichoderma lignorum*, on Loblolly Pine sapwood.**—With discussion. *Proc. Amer. Wood Pres. Ass.* 38, 1942 (134–9).

There is evidence that wood-inhabiting strains of *Trichoderma lignorum* cause a slight reduction in some of the strength properties of Loblolly Pine sapwood. The fact that this mould travels through natural openings rather than through cell walls may account for the small amount of damage.

31.42.11. MCKENZIE, M. A. **The control of wood decay.** *Pests* 10 (3), 1942 (20–1, 32–3). E.S.R. 87 (390).

A general discussion of the causes of wood decay, properties of decayed wood, resistance and susceptibility, and control practices, together with a bibliography of control information.

31.42.12 : 12.21 : 33.36.1 : 33.36.3. LINDGREN, R. M. **Temperature, moisture, and penetration studies of wood-staining *Ceratostomellae* in relation to their control.** *Tech. Bull. U.S. Dep. Agric.* No. 807, 1942. pp. 35. [Bureau of Plant Industry, U.S.D.A.]

A study on the temperature and moisture relations and rates of growth on agar and in *Pinus echinata* sapwood of *Ceratostomella* species, with special reference to *C. pilifera*. In sawmill yards antiseptic treatment with recognized control solutions should not be delayed by more than one day after infection with *C. pilifera* has occurred if control is to be expected under all conditions.

31.43. Attack by Animal Organisms

31.43 : 13.2. FISHER, R. C. **Furniture beetles and other wood-borers.** *Ann. appl. Biol.* 29, 1942 (313–6). [Forest Products Research Laboratory, Princes Risborough, Bucks.] L.S.

Includes notes on damage caused by and preventive treatments against *Xestobium rufovillosum*, *Anobium punctatum*, *Lyctus* spp., and *Hylotrupes bajulus*, and on remedial measures, as insecticides, fumigation and heat treatments, for use in the control of wood-boring insects.

31.43 : 13.2 : 05.3 (69). MAURITIUS. **Annual report of the Department of Agriculture 1940—Division of Entomology.** Govt. Printer, Port Louis. 1941 (14–6). I.I.E.

Wooden cases from Indo-China were found to be heavily attacked by the insects *Heterobostrychus aequalis* and *Dinoderus* sp. As these had not previously been recorded from Mauritius, the infested material was burnt.

31.8. *Quality and Defects of Timber*

31.8 : 12.25 : 42.1. FREY-WYSSLING, A. Über die Entstehung von Harztaschen. [**On the origin of resin pockets.**] *Schweiz. Z. Forstw.* 93, 1942 (101–6). [G.]

Evidence is presented to support the opinion that resin pockets in Larch and other conifers are due to cracks in the cambium caused by wind, and subsequently filled with resin.

31.8 : 31.21.33 : 12.25 : 56.02 : 31.27. TURNBULL, J. M. **A preliminary investigation into the causes of torsion in Pine stems.** *J. S. Afr. For. Ass.* No. 8, 1942 (112–7).

A series of static bending tests with 642 specimens derived from the butt logs of sixteen 22-year-old stems of *Pinus pseudostrobus*, grown on a uniform site, showed a significant inter-correlation between degree of torsion, breast height diameter and the ratio existing between modulus of rupture and specific gravity raised to a given power, which suggests that torsion is directly associated in some way with rate of growth.

31.8 : 31.1. : 12.25. GEERY, E. **Radial streak (red) and giant resin ducts in Spruce.** Forest Products Laboratory, Madison, Wis. *Mimeo.* No. 1391, 1942. pp. 2 + plates. P.R.

These two abnormalities, which are sometimes found in Spruce wood, are described in comparison with the structure of more normal wood.

31.8 : 33.4. GREENHILL, M. E. **The damping capacity of timber.** *J. Coun. sci. industr. Res. Aust.* 15, 1942 (146–53). A.P.B.

Timber has been shown to have a greater damping capacity ('internal friction' of structural materials) than the metals usually employed in aircraft construction.

32. HARVESTING OF WOOD. LOGGING

32 : 76.1. MATTHEWS, D. M. **Cost control in the logging industry.** McGraw-Hill Book Co., Inc., New York and London. 1942. pp. xii + 374.

This is an American textbook written by the Professor of Forest Management of the University of Michigan for forestry students who intend to enter the American logging industry. It is based on American conditions and all examples cited are in U.S. currency and volume units, and have approximate U.S. wage rates and prices. It is to be hoped that this will not deter British and Colonial foresters from its study, as this is a book well worth careful consideration by all foresters, wherever they are and whether their interests are primarily silviculture and conservation or utilization. In his preface Professor Matthews states that his interest in these methods was first aroused when working in the Philippines and expanded when developing logging operations in British North Borneo.

The author starts with a consideration of costs and their usual classification into 'fixed' or 'overhead' and 'variable' or 'direct' costs, and points out that, for any operation except the simplest, further analysis of what is usually considered as a 'variable' cost will reveal it as a 'mixed cost', made up of fixed and variable elements. Total cost rarely provides a suitable measure for the comparative cost analysis of logging operations, and for such purposes it should be reduced to cost per unit of production, part of which will be fixed and part variable. These unit costs may then be applied graphically or by a formula to determine the level of output at which they are equally economical—that is the 'break-even' point. The author then shows how costs, first classified as 'variable' but which are actually 'mixed', can be broken down for such comparisons and gives the formula for the ratio by which volume of output must be altered if the unit cost is to be kept the same for any two methods of operation, or by which variable costs must fall if fixed costs rise and the output is to remain constant. A chapter is devoted to the practical application of these methods.

Then follows an extremely useful chapter on unit costs and machine rates in which it is pointed out that as far as management is concerned 'cost data should be collected and presented in units that represent the result accomplished'. After this the data may be classified in any way suitable to the method of accountancy in use but any prior classification may fail to disclose the factors with which management is most concerned, though they may be adequate for some purposes of bookkeeping. This chapter also includes a section on fixed costs of machinery and plant, with a discussion of depreciation and interest and how these differ between publicly and privately owned plant.

The author then deals with the collection and preparation of cost data, mainly where machines are used, as trucks and tractors in hauling operations; the principles discussed can be adapted to any costing operation. The details showing the component costs of logging operations are of interest to all foresters whether they are directly concerned with log production and delivery or only with the proper value of the standing tree as this is largely determined by the cost of production.

The remainder of the book is devoted to the application of these principles to general problems of logging, such as the economic location of roads, the standard of roads required for true economy, and the selection of the most economical equipment. The principles of road spacing and formulae showing the relation of costs to spacing are first worked out for areas of easy topography where costs are directly related to distance, then with the necessary modifications where costs vary between uphill and downhill haulage. In this connexion it is of interest to note that when laying out logging roads on slopes, it is more economical to strike a balance between a short expensive uphill skid and a longer cheap downhill skid than to confine the operation to downhill skidding only. This discussion of the economics of road location should be of great value where the capital expense of road development has to be met by the State, or where the major forest road system is planned by the forest authority, as is the case in most of the British colonies.

Most of the discussion is based on the use of caterpillar tractors for skidding in the woods and of motor lorries to transport logs by road to the mill, but this modern method has proved itself so adaptable to a great variety of conditions that concentration on it rather than on the more old-fashioned methods or the specially American methods of high-lead or low-lead skidding is

probably an advantage. The economics of floating timber are not touched upon as this is not commonly practised in the United States.

Of general interest to all foresters is a comparison of costs as between clear felling and selective logging. It is pointed out that clear felling is not always most economical, even as a short term policy.

The procedure followed throughout is to generalize the methods of calculation into algebraic formulae and while these often appear highly complicated, they are not so difficult of application, even for the non-mathematical reader.

A. F.

32 : 76.1 : 85. WACKERMAN, A. E. **Why not budget logging costs?** *Sth. Lumberm.* 165 (2071), 1942 (49–51).

Suggestions are made for the estimating of logging costs per unit produce in relation to total volume of output, and for mapping logging-cost zones.

32.2. *Felling and Related Operations*

32.24 (71.3–7) : 32.25.5 : 43.3 : 23.1 : 45.3. FRANCIS, S. **Summer logging in eastern Canada.** *For. Chron.* 18, 1942 (145–51).

Summer logging may consist of sap-peeled pulpwood operations, rough pulpwood operations, or log operations, either pulpwood or saw timber. The sap-peeled pulpwood operation has been the most common practice; it must be carried out while the sap is flowing. Removal of the bark and the consequent drying of the wood results in a reduction in weight per cord which may account for a substantial saving in transport costs. Equipment and methods used in sap-peeling wood are described. Two main disadvantages of summer logging over winter logging are the increased fire hazard and the greater likelihood of damage to the timber by wood borers. The advantages and disadvantages of summer logging are summarized briefly.

32.25 : 07.7. **Filer perfects chain saw sharpening device.** *W. Cst. Lumberm.* 69 (8), 1942 (48).

The chain saw is held firmly on the circumference of a circular disc of plywood reinforced with thin iron sheets, and the teeth are ground, as in the case of a circular saw, with a grinding wheel.

32.25 : 07.7. **New electric chain saw.** *Timb. Tr. J.* 162, 1942 (341–2).

Description of a portable saw manufactured by Teles Smith Ltd. The saw is usually driven by an electric motor, but can be changed over to petrol drive. It can cross-cut a log 24 in. in diameter in approximately 45 seconds, it is reasonably light and costs £105 or £106, depending on cutting width.

32.25 : 07.7. **Power falling and bucking.** *Timberman* 43 (9), 1941–42 (90–2).

A report on the Atkins Hassler electric chain saw designed for the felling and cross-cutting of timber of large diameter. It has a 10-h.p. motor of very compact construction, the power being supplied by a diesel-generator set mounted on a tractor. Connexion is made by cable, which, by the use of a reel device, may be extended as far as 1,000 ft. The saw is soon to be available in a number of lengths from 46 to 88 in. Notable features claimed for this saw are its ability to cut through Redwood bark as well as Pine limbs, and a sufficiently light weight to allow of its use on a springboard in the felling of trees.

32.26 : 33.36.3 : 12.25 : 31.42.12 : 32.24. HILF, H. H. Holzerhaltung bei sommergefällten Kiefern. **[The wood preservation of summer-felled Pines.]** *Forstarchiv* 18, 1942 (185–94). [G.g.]

From preliminary investigations near Eberswalde it appears that summer-felled unbarked Pine timber can be stored in the forest for 2–4 weeks without being seriously affected by blue-stain. The timber should preferably be stacked in a high pile or in the shade, so that it conserves its moisture. After conversion open stacking and protection from rain are essential. In the main, the protection of summer-felled Pine from blue-stain is a problem of organization: extraction should follow felling with the least possible delay.

32.9. *Transport*

32.9 : 07.7. PARSONS, H. H. **The application of tractor and allied equipment in the logging field.** *For. Chron.* 18, 1942 (82–5).

A brief discussion of the various uses for different types of tractors and allied attachments in logging and pulpwood operations in northern Ontario. The increasing application of this equipment has resulted in lower costs and a subsequent release of labour for use in other industries.

32.9 : 07.7. ROBITAILLE, J. M. **Trip hooks for logging chains.** *Pulp Paper Mag. Can.* 43, 1942 (777).

A brief note on hooks that are used to release loads that are under tension, such as a boom of logs.

32.91.22 : 33.02. **Transporting pulpwood.** *Paper Tr. J.* 115 (4), 1942 (40). P.R.

A special trailer, 34 ft. long, 12 ft. wide and 7 ft. deep, with dump body, was designed by the Hayes Mfg. Co., Ltd., of Vancouver, B.C. to transport 25,000 cords of wood over a snow-covered road with an 8 per cent. grade. The trailer was attached to a Hayes BA 21 truck, and with this equipment it was possible to carry a 12-cord load with a gross weight of 89,000 lb.

32.92–4 : 07.7. **The Johnson boom.** *Pulp Paper Mag. Can.* 43, 1942 (716).

Where available timber is not large enough to make good boom logs, a satisfactory boom can be built from 40-in. pulpwood sticks. Each stick has a 1-in. hole bored in the centre and is threaded on an iron rod, alternate sticks being at right angles. Poles of the length of the boom are used to hold the small wood in position.

33. CONVERSION AND PRESERVATION OF WOOD

33.0. *Utilization Categories of Wood*

33.0 : 12.25 : 33.15 : 33.91. **Hemlock and Noble Fir for aircraft use.** *Timberman* 43 (10), 1941–42 (37).

Lumber cut from *Abies nobilis* and *Tsuga heterophylla* is acceptable as a substitute for Sitka Spruce in aircraft construction. Grading rules are suggested for selecting suitable logs of both species.

33.1. *Mechanical Conversion excluding the Manufacture of Mechanical Pulp*

33.15. Manufacture of Veneers and Laminated Wood. Gluing

33.15. **Construction glue for wooden columns.** *B.C. Lumberm.* 26 (8), 1942 (72).

A note on the application of water-resistant glues in the construction of wooden columns for outside use.

33.15. KISSER, J. Das mikroskopische Gefügebild des Lignostone. **[Microscopic features of lignostone structure.]** *Holz* 4, 1941 (419–25). [G.g.] P.R.

In the manufacture of Lignostone, the wood (mostly Beech) is compressed to about half its original volume, the pressure being exerted at right angles to the fibre direction. Microscopic investigations indicate that tears in the tissue are extremely rare. Cell deformations and changes in the position of cells and tissues are largely reversible by prolonged boiling in water, although there are indications that many cell components suffer irreversible changes in their finer structure.

33.15. NARAYANAMURTI, D., RANGANATHAN, V., and BASU ROY CHAUDHURI, P. K. **Studies on adhesives. Part I. Ground-nut protein adhesives for plywood.** *Indian For. Leafl.* (*Utilisation*) No. 15, 1942. pp. 9. [Forest Research Institute, Dehra Dun.] P.R.

Experiments are described. All formulae tried give satisfactory dry strengths, while some give satisfactory wet strengths as well.

33.15. NARAYANAMURTI, D., and SINGH, K. **Studies on adhesives. Part II. Ground-nut protein-formaldehyde dispersions as plywood adhesives.** *Indian For. Leafl.* (*Utilisation*) No. 16, 1942. pp. 13. [Forest Research Institute, Dehra Dun.] P.R.

33.15. **Plywood used as lumber.** *Veneers and Plywood* 36 (7), 1942 (8–9). P.R.

A note on some uses for which plywood can replace solid lumber.

33.15. **Scarfed joints.** *Timberman* 43 (11), 1941–42 (36–7). [Resinous Products & Chemical Co., Philadelphia.]

A brief illustrated note on scarf jointing of plywood for the purpose of enlarging the sheet, as for use in boat and aircraft construction, and at the same time maintaining as far as possible its normal strength without increasing the thickness of the joint.

33.15. VORREITER, L. Gehärtete und mit Metall oder Öl getränkte Hölzer. **[Hardened woods and woods impregnated with metal or oil.]** *Holz* 5, 1942 (59–69). [G.g.] P.R.

Results from recent physical and technological investigations on Lignostone (compressed non-laminated wood), Lignofol (compressed plywood), metal-impregnated woods, and oil-impregnated woods are summarized and some of the uses of these materials are noted. A selected bibliography is appended for each material. In addition to being useful substitutes for a number of metals, these materials may have uses for which they are superior to both metals and wood. Thus metal- and oil-impregnated woods have proved their special value in the construction of bearings for various types of machinery.

33.15 : 01.4. **Precompression gluing method.** *Timberman* 43 (12), 1941–42 (48).

Improvement in the quality of the bond in plywood is effected by applying a preliminary cold pressure of about 250 lb. per sq. in. for 30 seconds immediately after the glue is spread and before the assembly is passed to the hotpress.

33.15 (97) : 31.2. HARDY, E. **British veneer and plywood.** *Veneers and Plywood* 36 (5), 1942 (14–5). P.R.

Brief notes on the source and characteristics of the more important decorative veneer timbers available in the British Empire.

33.15 : 31.27 : 01.4 : 12.25. MARKWARDT, L. J., and FREAS, A. D. **Approximate tentative methods of calculating the strength of plywood.** Forest Products Laboratory, Madison, Wis. Revised ed. 1942. pp. 2 + tbls. P.R.

33.15 : 31.4. KÜCH, W. Zeit- und Dauerfestigkeit von Lagenhölzern. **[The lasting durability of plywoods.]** *Holz* 5, 1942 (69–73). [G.g.] P.R.

Account of tests on SCH-T-BU-20, the plywood used in German aircraft manufacture.

33.15 : 33.32. KOLLMANN, F. Vergütete Hölzer und holzhaltige Bau- und Werkstoffe, Begriffe und Zeichen. Erläuterungen zum Normblatt DIN4076. **[Improved woods and materials containing wood: terms and symbols. Explanatory notes to German standard specification DIN4076.]** *Holz* 5, 1942 (41–59). [G.] P.R.

An account of the steps that led to the preparation of this standard specification and of its scope and composition is followed by a summary of the properties, uses, and manufacturing firms of the materials covered by the specification. These fall into four broad categories:—(1) non-laminated materials (Vollholz), e.g. Lignostone; (2) laminated materials (Lagenholz), e.g. plywoods; (3) materials made from wood chips (Holzspanstoffe), e.g. wood-wool boards; and (4) wood-fibre boards. The paper includes a detailed bibliography.

33.15 : 33.36.1 : 12.25. HUBERT, E. E., and RASMUSSEN, C. A. **Shear tests of permatol-treated Pine glue joints.** *Res. Lab. Note Western Pine Ass.* No. 16, 1940. pp. 4.

The tests described provide some indication of treatment conditions that may cause serious weakening of the shear strength of glue joints in Ponderosa Pine material.

33.15 : 33.6. GREGORY, C. E. **Plywood shipping drums.** *Veneers and Plywood* 36 (7), 1942 (10–11). P.R.

33.15 : 33.6. **Plywood drums for powders and liquids.** *Mon. News Lett. Div. For. Prod. Aust.* No. 126, 1942 (3).

New developments are noted in the use of plywood for containers in both India and Australia.

33.15 : 33.8. WAKEFIELD, W. E. **Plywood in the construction of aeroplanes.** *Emp. For. J.* 21, 1942 (18–20). [Dominion Forest Service, Ottawa.]

Plywood of three-ply construction, made from thin veneers of suitable woods, particularly Yellow Birch, can be used successfully as the skin or covering in aeroplane construction. Structural members are frequently built up of plywood, the standard of quality required varying with the potential stress of the area in which they are to be used. Among the species that have been approved for plywood of lower quality are Alder, Aspen, Basswood, Cottonwood and Poplar. Mention is made of the use of thin veneers and thermoplastic resin glues in aeroplane construction, the material being moulded into the required shape by heat and pressure.

33.15 : 38.2. TAMPLIN, H. L. **Laminated beam construction.** *Timber of Canada* 3 (1), 1942 (74, 76, 78, 82). [General Engineering Co. (Canada) Ltd.]

Satisfactory results are reported from recent practical experience with laminated beams in large-scale building construction.

33.17. Sawmilling

33.17 : 07.7. **Converting round timber.** *Timb. Tr. J.* 62, 1942 (373–5).

It is argued that circular rack benches, which at present are employed in Britain to a considerable extent, are inefficient in comparison with band mills and usually involve an avoidable waste of timber of not less than 15 per cent.

33.17 : 82. MEIER, W. Sicherheitsregeln für Holzbearbeitungsmaschinen. [**Safety rules for woodworking machines.**] *Holztechnik* 22, 1942 (162–3). [G.] P.R.

33.17 : 07.7. WILSON, S. E. **Studies in log conversion. I. Mass production of deals, battens and boards. II. Mass production of D.B.B.—Sawing rules and yields. III. Sawing for quality—North American practice. IV. North American practice—Economics of production. V. Head-saws for home-grown timber. VI. Classification of H.-G. saw mills—Distribution of logs.** *Timb. Tr. J.* 162, 1942 (515–6, 563); 163, 1942 (61–2, 109–10, 253–5, 399–400).

Notes on the mass production of sawn timber in Northern Europe with special reference to the use of vertical frame saws; on North American sawing methods, notably the conversion of big logs using vertical band saws; on the common types of sawing equipment employed in Great Britain; and on the business organization of sawmills handling British timber.

33.19. Other Forms of Mechanical Conversion

33.19 : 34.6. HARRISON, J. D. B. **Wood flour.** Forest Products Laboratories, Dominion Forest Service, Ottawa. 1940. pp. 6.

Notes on the manufacture of, and demand for, wood flour with special reference to Canada, where it is used mainly in the production of linoleums and explosives.

33.3. *Chemical Treatment*

33.32. Pulp and Paper Manufacture. Plastics

33.32. HARRIS, E. E., and LOFDAHL, L. J. **The reaction of methyl hypochlorite with lignin.** Forest Products Laboratory, Madison, Wis. *Mimeo.* No. *R*1254, 1941. pp. 4 + tbls.

33.32. WILKE, A. Das Bindemittel in der Faserplattenfertigung. [**Binding materials for fibre boards.**] *Holz* 5, 1942 (78–81). [G.g.] P.R.

A summary of recent literature and patents, with special reference to artificial resins.

33.32 : 12.25. BRAY, M. W., and MARTIN, J. S. **Pulping Florida Sand Pine (*Pinus clausa*) for kraft, high-grade papers, and newsprint.** *Sth. Pulp Paper J.* 5 (1), 1942 (7–14). [Forest Products Laboratory, Madison, Wis.]

Experimental shipments of *P. clausa*, indigenous to the Ocala National Forest of central Florida, were tested to determine the suitability of this species for paper-pulp manufacture. The physical and chemical properties of the wood as well as its adaptability to the several alkaline pulping processes were investigated. The density of the wood of *P. clausa* together with its relatively high cellulose and low lignin and pentosan contents indicate the possibility of pulp yields equal to many of the common commercial pulpwood species. The possibility of making a wide variety of papers including kraft wrapping, high-grade paper, and newsprint from this species was demonstrated.

33.32 : 12.25. KLAUDITZ, W. Zur Technologie verholzter pflanzlicher Zellwände. [**On the technology of lignified plant cell walls.**] *Papierfabrikant* 40, 1942 (153–61). [G.] P.R.

A general discussion of the tensile strength and other mechanical properties of paper as related to the properties of the raw material and the process of manufacture. The reasons for the popularity of Spruce pulp are outlined.

33.32 : 12.26–8. JAYME, G., and LOCHMÜLLER-KERLER, E. Über die Gewinnung von Papierzellstoffen in höchster Ausbeute und höchster Festigkeit aus Buchenholz, sowie die Wechselbeziehungen zwischen Ausbeute, chemischer Zusammensetzung und Festigkeit. [**On the production of paper pulp in large quantities and of high strength value from Beech wood, and on the correlation between yield, chemical composition and strength.**] *Holz* 5, 1942 (10–19). [G.g.] [Technische Hochschule, Darmstadt.] P.R.

A yield of 70·16 per cent. of bleached sulphite pulp was obtained by a mild sulphite cook at a maximum temperature of 105° C. and bleaching with sodium chlorite. The strength properties of the pulp were only moderate, due to an excessive content of lignin and hemicellulose, and were increased by gradually lowering the content of these materials, using soda lyes of different concentrations. The pulp of average maximum strength corresponded to a yield of 50 per cent. in terms of oven-dry wood.

33.32 : 12.29. TUTIYA, M., HUKUHARA, S., and KATO, Y. **Bamboo in Taiwan as raw material for pulp. V. Digestion of 'Keitiku' by the magnesium sulfite method.** *J. Agric. Chem. Soc. Japan* 17, 1941 (479–82). [Jap.] *Bull. Agric. Chem. Soc. Japan* 17, 1941 (49–50). [E.] Chem. Abs. 36 (4332). P.R.

33.32 : 31.3. YORSTON, F. H. **Studies in sulphite pulping.** *Bull. Dom. For. Serv.* No. 97, 1942. pp. 80.

An account of laboratory investigations into the sulphite pulping process with suggestions for the application of the results to cooking under mill conditions.

33.32 : 31.3. DURGIN, A. G., and DAVIS, E. M. **Chemical recovery in sulphate pulp mills.** *Pulp Paper Mag. Can.* 43, 1942 (590, 589).

33.32 (485) : 33.39 : 98.1. GRANT, J. **The world cellulose problem.—Some recent technical advances in Sweden.** *Industr. Chem. chem. Mfr.* 18, 1942 (324–9). L.S.

The author reviews briefly the effect of the war on the pulp and paper industries and trade of Sweden, Norway and Finland and notes the developments that have taken place in the Swedish industry in the production of cellulose fodder ('Cellfor') and alcohol.

33.32 (68) : 98.1. WHITE, J. **The manufacture of pulp and paper in South Africa.** *Tech. suppl* to *World's Pap. Tr. Rev.* July 24, 1942 (29–43). L.S.

A description of the plant and processes employed by the South African Pulp and Paper Industries Ltd. Much of the development of this factory has taken place under war conditions, and it now produces an amount of paper (made from South African raw materials) equal to 50 per cent. of the country's normal requirements.

The chemical and electrolytic section, the pulp plant, and the paper and board mill are described in some detail.

33.32 : 31.1. JAYME, G. Wege zur Erzeugung von Papierzellstoffen maximaler Festigkeit. [**Means of producing paper pulp of maximum strength.**] *Papierfabrikant* 40, 1942 (137–44; 145–52). [G.g.] P.R.

The influence of wood-fibre morphology and chemical composition of pulp on the strength of the latter is discussed, using data from recent literature and from investigations at the Technische Hochschule Darmstadt. The general strength properties of the pulp appear to be influenced by fibre length only in so far as very short fibres (less than 0·3 mm. in length) tend to give a weak pulp. The ratio—thickness of the fibre wall/fibre width—appears to be negatively correlated with the strength of the pulp. Thus the thick-walled Beech fibres yield a weaker pulp than the thin-walled Poplar fibres. Among the chemical properties of the pulp that influence strength, special stress is laid on the hemicellulose content, and it is shown that for a given raw material and pulping process, maximum strength corresponds with a certain optimum content of hemicellulose.

33.32 : 33.02 : 07.7. SAMSON, T. Über das Hacken von Holz in Späne. [**The chipping of wood.**] *Svensk PappTidn.* 45, 1942 (175–82). [Sw.] *Abstr.* in *Auszüge aus der Literatur—suppl.* to *Papierfabrikant* 40, 1942 (38). [G.] P.R.

Includes a description of a new high-speed chipper with ten knives patented by the Norwegian Ottersland. The chipper is claimed to furnish wood chips of uniform length and to decrease waste by 0·8 per cent., in terms of the weight of the wood chipped. The wood is fed intermittently into the machine, variations in electric power consumption being equalized by a flywheel. Power consumption is high.

33.32 : 34.6. BIRCHARD, W. H. **Waste in pulp manufacture.** Technical Section, Canadian Pulp & Paper Association, Montreal. 1941. pp. 4.

Report on a survey made to determine the amount of waste occurring at various stages in the manufacture of pulp, and how such waste materials can be used to best advantage.

33.32 : 34.6. **Forest Products Laboratory plastic wood.** Forest Products Laboratory, Madison, Wis. *Mimeo.* No. *R*1277, 1941. pp. 6.

Green wood soaked in urea solution and subsequently dried becomes plastic upon the application of heat and retains its new shape on cooling. Its strength properties are about equal to those of ordinary, untreated wood. Sawdust treated with urea and placed under heavy pressure can be formed into solid sheets or panels. The resulting material is very hard and difficult to nail, but its sawing and machining properties are good, and it is non-corrosive to metal fastenings. In strength qualities it is comparable with other plastics [cf. *For. Abs.* 3 (318)].

33.36. Preservation of Wood. Seasoning and Drying

33.36.1. *Preservation against Attack by Plants and Animals*

33.36.1. BOND, W. R. **Pressure creosoted wood—a war weapon.** *Timber of Canada* 3 (1), 1942 (90, 92, 94).

Notes on the use of pressure-creosoted wood in air port drainage, pipe-line construction, hangar building and the construction of culverts.

33.36.1. **Report of Special Committee on painting o creosoted wood.** *Proc. Amer. Wood Pres. Ass.* 38, 194 (85–111 + tbl.).

Data relating to the service records of various paint on creosoted wood. Three kinds of wood (Southern Pine, Douglas Fir, Lodgepole Pine), two types of treatment (empty cell and full cell), and two preservative (creosote, and creosote-petroleum solution) are represented. Appendix A deals with the field application of selected paints, and Appendix B with terminology and with directions to inspectors.

33.36.1 SUMMERHAYS, W. A. **Wartime conditions i the wood-preserving industry.** *Proc. Amer. Wood Pres Ass.* 38, 1942 (234–7).

A general outline of the effect of wartime restriction and of possible future trends in the wood-preservin industry.

33.36.1 (54). NARAYANAMURTI, D. **A short note o wood preservation for users in India.** *Indian For. Bull (n.s.) Utilisation* No. 110, 1942. pp. 22 + plates [Forest Research Institute, Dehra Dun.]

This bulletin discusses wood preservation under the headings:—wood preservatives; preparation of materia for treatment; treating processes; handling of timbe subsequent to treatment; cost of treatment; protection of wood by methods other than standard preservative treatments. Included are the Indian Stores Depart ment Standard Specifications for creosote and fo petroleum to blend with creosote.

33.36.1 (73) : 33.4 : 33.5 : 09.4. SHIPLEY, G. B. **A review of the lumber, crosstie, and wood preservin industry in the United States—51-year period (1890 1940).** *Proc. Amer. Wood Pres. Ass.* 38, 1942 (534–59)

33.36.1 (73 : 71 : 72) : 09.4. **Wood-preserving plants i United States, Canada, and Mexico.** *Proc. Amer Wood Pres. Ass.* 38, 1942 (524–33).

33.36.1 (94) : 12.21. BLAND, D. E. **A study of th toxicity of Australian vertical retort creosote oils t *Lentinus lepideus* Fr., *Polystictus versicolor* (L. Fr., and Madison 517.** *J. Coun. sci. industr. Res. Aust* 15, 1942 (135–46). A.P.B.

It was found that Australian vertical retort creosotes are of substantially the same toxicity as horizontal retor oils of approximately the same distillation range, and vertical retort oils of lower creosote boiling range ar more toxic than those of higher creosote boiling range It is pointed out that the most toxic oils are not neces sarily the best wood preservatives.

33.36.1 : 07.7. NARAYANAMURTI, D. **Cheap and simple types of tanks for the treatment of timber by th dipping, steeping or open tank process.** *Indian For. Bull (n.s.) Utilisation* No. 111, 1942. pp. 3 + figs. [Fores Research Institute, Dehra Dun.]

The metal tank described is made from old iron drums. Simple methods of heating a preservative in brick or cement tanks are also described.

33.36.1 : 07.2 : 12.25 : 31.42.1. REID, J. J. **A study of several products of Disco type low temperature coa tar as wood preservatives.**—With discussion. *Proc Amer. Wood Pres. Ass.* 38, 1942 (435–50).

Oven-dried test blocks of Yellow Pine sapwood were treated at various retentions with preservatives made

from Disco tar and with recognized good commercial preservatives and exposed to attack by *Lenzites trabea* and *Poria incrassata*. Results indicated that Disco creosote compares favourably with high temperature creosote as a wood preservative.

33.36.1 : 12.25. HARRAR, E. S., and REID, D. G. **Retention of creosote oil in the wood of *Pinus occidentalis* Swartz.** *Trop. Woods* No. 71, 1942 (33–5.) [Duke University.]

The results from a series of tests showed that the wood of *Pinus occidentalis* from Haiti will accept adequate amounts of oil using standard methods of impregnation.

33.36.1 : 12.25 : 33.53. MACLEAN, J. D. **Sapwood depth and absorption limits in round coast Douglas Fir timbers.** *Proc. Amer. Wood Pres. Ass.* 38, 1942 (117–27 + tbl.). [Forest Products Laboratory, Madison, Wis.]

Data are given on the average depth of sapwood in coast Douglas Fir poles and piling, and methods are outlined for computing the maximum practicable absorptions.

33.36.1 : 12.25 : 12.26–8 : 33.4 : 33.52–4. **Report of Special Committee on co-ordination and standardization of treatment specifications.** *Proc. Amer. Wood Pres. Ass.* 38, 1942 (61–2).

The specifications concern Jack Pine, Red Pine and Lodgepole Pine poles, Pine posts, and Gum and Southern Pine lumber and ties. The Lowry and Rueping processes are combined and standardized.

33.36.1 : 31.43 : 13.2. HUNT, G. M., and SNYDER, T. E. **An international termite exposure test—thirteenth progress report.** *Proc. Amer. Wood Pres. Ass.* 38, 1942 (450–62). [Forest Products Laboratory, Madison, Wis.]

33.36.1 : 31.8 : 12.25. HUBERT, E. E. **Paint discolorations.** *Res. Lab. Note Western Pine Ass.* No. 15, 1940. pp. 2.

Note on the causes and possible control of discolorations of white paints and enamels on Pine millwork.

33.36.1 : 33.12. **Report of Committee 7–11—uses of treated wood for car lumber.**—With discussion. *Proc. Amer. Wood Pres. Ass.* 38, 1942 (291–8).

Report of supplementary information on the use of treated lumber for railroad cars, and of service records of treated and untreated car lumber.

33.36.1 : 33.31. BAECHLER, R. H., and SERVAIS, P. **Determination of nickel and copper chromates and nickel, copper, and magnesium arsenates in treated wood.** *Proc. Amer. Wood Pres. Ass.* 38, 1942 (19–23).

Methods for the chemical analysis of wood treated with different combinations of salts.

33.36.1 : 33.31. BERLINER, I. **Use and application of nitrocellulose wood lacquers.** *Paint Varn. Prod. Mngr.* 22, 1942 (199–202). L.S.

33.36.1 : 33.31 (73) : 09.4. HELPHENSTINE, R. K. **Quantity of wood treated and preservatives used in the United States in 1941.** *Proc. Amer. Wood Pres. Ass.* 38, 1942 (498–522 + tbls.)

The basic data for this compilation were obtained from the returns of a standard questionnaire issued to wood-treating concerns maintaining permanent treating plant equipment. A detailed account is given of the distribution, class, and type of treating plants in the United States, the consumption of preservatives, the range of prices, the quantities of domestic and imported creosote, the preservatives used, and the types of material treated.

33.36.1 : 33.31. HRIBAR, V. P. **The corrosion resistance of wood preserving plant metals.** *Proc. Amer. Wood Pres. Ass.* 38, 1942 (171–206). [American Lumber and Treating Co.]

Data showing the results of experiments with 14 different types of metal to determine the corrosive effect of immersion (alternate, partial and complete) in static solutions of creosote, Wolman salts (tanalith and erdalith), and chromated zinc chloride during a 6 months' test period.

33.36.1 : 33.31. HUNT, G. M., BAECHLER, R. H., and BLEW, J. O. **Preservatives, priorities, and processes.** *Proc. Amer. Wood Pres. Ass.* 38, 1942 (62–84). [Forest Products Laboratory, Madison, Wis.]

A discussion on the possible use of substitute preservatives should creosote and other commonly used preservatives become unavailable. The substitutes mentioned include chlorinated phenols, water-gas tar, low-temperature tars and creosotes, certain by-products of aromatic petroleum oils, wood-tar creosotes, and copper or other metallic naphthenates. It is suggested that the use of preservative salt and oil treatments (including zinc-chloride-petroleum treatments) might be extended, and the properties of less well known preservative salts investigated. Treatments other than pressure treatments may also prove of use in an emergency.

33.36.1 : 33.31. MCMAHON, W., HILL, C. M., and KOCH, F. C. **Greensalt—a new preservative for wood.** *Proc. Amer. Wood Pres. Ass.* 38, 1942 (334–48).

Greensalt includes several mixtures of chromates, copper compounds and arsenic acid. The composition that has been studied most thoroughly is known as Greensalt K and consists of five parts of potassium dichromate, three parts of copper sulphate and one part of arsenic acid. When injected into the wood the chemicals essential for preservation are changed to compounds that are insoluble in water. For best results the poles should be seasoned before treatment, their moisture content being 35 per cent. or less; seasoned poles are not steamed before treatment. Present treating requirements are that 1 lb. of total salts be retained per cu. ft. of timber, which for Southern Yellow Pine is obtained by applying a solution concentration of about 7 per cent. by the empty-cell process. In experimental tests Greensalt preservative has given results highly favourable in comparison with grade 1 creosotes. Poles treated with Greensalt are finally green or olive in colour and are clean to handle and paintable.

33.36.1 : 33.31. **Report of Committee 4—preservatives.**—With discussion. *Proc. Amer. Wood Pres. Ass.* 38, 1942 (25–60).

Revisions of (*a*) Standard Specification for creosote coal-tar solutions (5e) and (*b*) Standard Specification for petroleum for blending with creosote (49b) are adopted as standards of the Association, and the standard visual method for determining sodium fluoride penetration in treated wood (28a) is withdrawn from the manual of the Association. The preservatives chromated zinc chloride, tanalith-U, and zinc metarsenite are considered in relation to six fundamental requirements of preservative materials, and on the basis

of the data presented it is recommended that a standard specification be drawn up for each of these three preservatives which are at present in commercial use.

33.36.1 : 33.4. MELLECKER, J. B., and BAKER, M. W. **Expected service effectiveness of preservative treatments applied to millwork.—A laboratory method of comparison.** *Industr. Engng. Chem.* 14, 1942 (305–8). L.S.

A practical laboratory method for evaluating and comparing the effectiveness of various millwork preservatives is described. This method provides moisture for the specimen in the same manner in which most of the moisture is supplied to millwork in service—namely, by condensation. The specimens are compared either by visual examination of the split specimen or by microscopic examination of sections of specimens. *Authors' summary.*

33.36.1 : 33.4 : 33.5 : 12.25. **Report of Joint Committee on Douglas Fir, pressure treatment.**—With discussion. *Proc. Amer. Wood Pres. Ass.* 38, 1942 (114–7).

Recommendations made in 1941 with regard to A.W.P.A. Specifications Standards 38b, 41b, and 51a are adopted as full standards [cf. *For. Abs.* 3 (323).] Intermountain Fir and Western Hemlock are included in the specification tentatively for the year.

33.36.1 : 33.4 : 33.52 : 12.26–8. **Report of Committee 5–1—Oak ties and lumber, pressure treatment.** *Proc. Amer. Wood Pres. Ass.* 38, 1942 (111–4 + tbl.).

Additional data received by the Committee indicate that the recommendations in the 1941 report for a minimum penetration of 65 per cent. of the annual rings of Red Oak needs no modification. It is suggested that if a penetration of 95 per cent. of the sapwood of White Oak is obtained, heartwood penetration is unnecessary.

33.36.1 : 33.4 : 38.2. **Report of Committee 7–10—diversified uses of treated wood.**—With discussion. *Proc. Amer. Wood Pres. Ass.* 38, 1942 (271–90).

Notes and illustrations are given on new and previously reported miscellaneous treated-wood products and on diversified uses of treated wood in the Pacific southwest States. The revision of A.W.P.A. Standard 50a, proposed in the 1941 report [cf. *For. Abs.* 3 (324)], is adopted by the Association.

33.36.1 : 33.4 : 38.3. **Report of Committee 7–2—bridge and structural timber.** *Proc. Amer. Wood Pres. Ass.* 38, 1942 (330–3).

A report on the original preservative treatment and present condition of railway timber bridges and culverts in Arizona that have been in service for 25 years.

33.36.1 : 33.52 : 33.53. BLUM, B. **Service rendered by various species of tie timber in the Northwest.**—With discussion. *Proc. Amer. Wood Pres. Ass.* 38, 1942 (225–33).

Records from test tracks indicate the average life in years of each species of treated sleepers to be as follows:—Red Oak and Rock Elm, 34; Maple, 33; Birch, 32; and Ash, 28; or an average of 33 for the hardwoods; Douglas Fir, 25; Tamarack and Larch, 24; Western Yellow Pine, 27; Lodgepole and Jack Pine, 21; and Hemlock, 31; or an average of 25 for the softwoods. Preservatives include creosote, 80–20 creosote-coal tar solution or 45–55 creosote-petroleum mixture. Creosote-treated Douglas Fir piles have an average life of at least 30 years in *Teredo-* and *Limnoria*-infested waters compared with that of often a few months for untreated material, while creosote treatment of Douglas Fir bridge material may increase its service life from 8–16 to 30–40 years.

33.36.1 : 33.52. **Report of Committee 7–1—tie service records.** *Proc. Amer. Wood Pres. Ass.* 38, 1942 (305–21 + tbl.).

Records are given for a number of test tracks of sleepers in the United States, representing a variety of species, preservative treatments and service periods.

33.36.1 : 33.52 : 33.4 : 12.25. **Report of Committee 5–2—Southern Pine ties and lumber, pressure treatment.**—With discussion. *Proc. Amer. Wood Pres. Ass.* 38, 1942 (127–33).

Standard Specification (53a) for the preservative treatment of Southern Pine ties and lumber by pressure processes is adopted as a tentative standard. Details of the Specification are given.

33.36.1 : 33.52 : 33.4 : 12.26–8. **Report of Committee 5–3—Gum ties and lumber, pressure treatment.**—With discussion. *Proc. Amer. Wood Pres. Ass.* 38, 1942 (140–8).

A Standard Specification (54a) for the preservative treatment of Black or Red Gum ties and lumber by pressure processes is presented for information.

33.36.1 : 33.52. WHITNEY, C. N. **Report on northern Pacific test tracks at Plains, Mont., Thompson Falls, Missoula, and Lolo.**—With discussion. *Proc. Amer. Wood Pres. Ass.* 38, 1942 (322–9). [Northern Rocky Mt. Forest & Range Exp. Sta.]

33.36.1 : 33.53. **Report of Committee 7–4–1—marine piling service records.** *Proc. Amer. Wood Pres. Ass.* 38, 1942 (364–70).

Reports are given of marine piling in Southern Pacific Company structures on San Francisco Bay and of creosoted Pine piling in Galveston harbour.

33.36.1 : 33.53 : 12.25. HARKOM, J. F. **Creosote treatment of White Pine piles.** *Proc. Amer. Wood Pres. Ass.* 38, 1942 (149–50).

The results of two tests indicate that it should be possible to treat White Pine piles with 12 lb. of creosote per cu. ft. of wood after 4 to 8 weeks' air-seasoning. There was no checking in the heartwood as is usually the case with Red Pine treated in this way.

33.36.1 : 33.53 : 12.25 : 33.31. LUMSDEN, G. Q., and HEARN, A. H. **Greensalt treatment of poles.**—With discussion. *Proc. Amer. Wood Pres. Ass.* 38, 1942 (349–63 + tbl.).

A specification for the treatment of Southern Pine poles with Greensalt was drawn up in 1940, based on large-scale experimental treatments on full-sized poles. The four essential requirements in the specification are:—(1) the poles should be well air-seasoned before treatment; (2) the penetration should be at least equal to that of the 8-lb. empty-cell creosoted pole; (3) the empty-cell process should be employed for Southern Pine treatment; and (4) the retention should be a minimum of 1 lb. of dry salts per cu. ft. of wood. The treatment is applied without heat. Details are given for the first commercial treatments with this preservative.

33.36.1 : 33.53 : 12.25. **Report of Committee 5–5–1—poles, pressure treatment.** *Proc. Amer. Wood Pres. Ass.* 38, 1942 (151–3).

Minor changes are made in the tentative standard specifications for the preservative treatment of Jack Pine, Red Pine and Lodgepole Pine poles by pressure

processes, as presented in the 1941 report, and the amended specifications are adopted as full standards.

33.36.1 : 33.53 : 12.25. **Report of Committee 5–5–2—poles, non-pressure treatment.**—With discussion. *Proc. Amer. Wood Pres. Ass.* 38, 1942 (400–9).

Includes a brief note on each of seven methods for groundline treatment of poles; the preservative used, method of application, and estimated cost per pole are given for each.

33.36.1 : 33.53 : 12.25. **Report of Committee 7–7—pole service records.** *Proc. Amer. Wood Pres. Ass.* 38, 1942 (213–23).

Data are presented on the service records of pole installations of various companies.

33.36.1 : 33.53 : 12.25. WENTLING, J. P. **Developments in treating Western Red Cedar poles.**—With discussion. *Proc. Amer. Wood Pres. Ass.* 38, 1942 (409–18).

The newest and most promising non-pressure full length immersion treatment of Cedar poles includes the use of pentachlorophenol as the toxic agent and a light distillate oil as solvent and carrier. Pentachlorophenol was selected because of its high toxicity, low water solubility, and low volatility. Poles are completely manufactured before being treated. Complete immersion in a 5-per-cent. pentachlorophenol solution causes the preservative to spread over and into the sapwood of the entire pole. The final average retention is at least 5 lb. of solution per cu. ft. of sapwood.

33.36.1 : 33.53 : 31.42.1 : 31.43. RICHARDS, A. P. **Progress report on timber and timber preservation exposure tests.** *Proc. Amer. Wood Pres. Ass.* 38, 1942 (371–99 + tbls.).

Data obtained from exposure tests carried out at Almirante, Panama, and Newport, R.I. to determine the efficacy of certain preservative treatments in the prevention of attack by marine wood-destroying organisms, fungi and termites.

33.36.1 : 33.54. **Many creosoted posts used in fencing government property.** *Wood Pres. News* 20, 1942 (79–81). P.R.

Posts treated by an empty-cell process with a final retention of 6 lb. of creosote per cu. ft. are being used extensively for fencing government property in the United States, the principal species being Southern Yellow Pine, Lodgepole Pine, Norway Pine, Ponderosa Pine and Douglas Fir. It is noted that creosoted posts, which have been seasoned for several months after treatment, are nearly immune to damage by ordinary grass fires, and that freshly creosoted posts can withstand a severe fire test.

33.36.1 : 33.54. **Report of Committee 7–9—post service records.**—With discussion. *Proc. Amer. Wood Pres. Ass.* 38, 1942 (418–35).

Data on the service records of posts of various kinds, including some treated with new preservatives.

33.36.1 : 33.54 : 12.25. **Report of Committee 5–6–1—posts, pressure treatment.**—With discussion. *Proc. Amer. Wood Pres. Ass.* 38, 1942 (153–60).

The Standard Specification (37d) for the pressure treatment of round Pine posts, recommended in the 1941 report [cf. *For. Abs.* 3 (325)] is adopted as a full standard.

33.36.1 : 33.54 : 33.31. NETTLES, W. C. **Treating fence posts with chromated zinc chloride.** *Agric. News Letter, Pub. Relations Dept., E. I. du Pont de Nemours & Co.* 10, 1942 (65–6). Chem. Abs. 36 (4308). P.R.

Pine fence posts treated with chromated $ZnCl_2$ (2 lb. per gal., used at the rate of 0·75 lb. per cu. ft. of wood) were still sound after 4 years in the ground, while untreated posts rotted within 2 years.

33.36.1 : 33.8. **Making log cabins endure.—Suggestions on preservatives, chinking, and exterior and interior finishes.** Forest Products Laboratory, Madison, Wis. *Mimeo.* No. *R*982, (revised ed.) 1941. pp. 12.

33.36.1 : 98 : 33.1 : 33.31 : 33.36.3 : 52.43.2. **Report of Committee 5–9—inspection.**—With discussion. *Proc. Amer. Wood Pres. Ass.* 38, 1942 (206–12).

The revision of A.W.P.A. Standard 2c presented in the 1941 report as Standard 2d—Standard Recommendations for the Purchase and Preservation of Forest Products—is adopted by the Association.

33.36.2. *Fireproofing*

33.36.2. METZ, L., and SEEKAMP, H. Prüfung von Feuerschutzmitteln für Holz nach dem Verfahren DIN 4102. **[Investigation of the fire-proofing treatment for timber by the process DIN 4102.]** *Holz* 5, 1942 (19–26). [G.g.] [Chemisch-Technische Reichsanstalt, Berlin.] P.R.

The standard test procedure is discussed. It is suggested that it should be supplemented by tests on the resistance of the fire-retarding substances to weather, their capacity of penetration into wood, and their resistance to fungal attack.

33.36.2. **Report of Committee 9—fireproofing.** *Proc. Amer. Wood Pres. Ass.* 38, 1942 (482–8).

Reports on a number of laboratory and performance fire tests.

33.36.2. **The fireproofing of timber.** *Tech. Leafl. Timb. Devel. Ass.* No. 4, 1942. pp. 10.

Common impregnation and surface-coating methods are described, and lists are appended giving the addresses of British manufacturers of chemicals used in improving the fire resistance of timber.

33.36.2 : 33.31. KLEECK, A. VAN. **Corrosion studies with certain fire-retardant chemicals.** *Proc. Amer. Wood Pres. Ass.* 38, 1942 (160–71). [Forest Products Laboratory, Madison, Wis.]

The corrosive action of certain fire-retardant chemicals on aluminium, half-hard brass, copper, cold-rolled steel and zinc was investigated. Under the specific conditions of the tests, the solutions without sodium dichromate, with a few exceptions, were definitely corrosive. Sodium dichromate inhibited corrosion to a greater or less extent in all but a few cases.

33.36.2 : 33.36.1. ANDREWS, L. K. **A study of fire-proofing standards for pressure-treated lumber.** *Proc. Amer. Wood Pres. Ass.* 38, 1942 (462–81). [American Lumber and Treating Co.]

Certain retentions of fireproofing salts of known composition give certain degrees of fire-resistance. No substantial degree of fire retardation was observed where the retention was less than 3 lb. per cu. ft., while a retention of over 6 lb. per cu. ft. caused only a slight further increase in fire-resistance. The fire-tube, crib, and special-crib test methods seem to be reliable for determining the effectiveness of fire-retardant treatments, but the timber test does not give reliable results. Attention is drawn to the possible use of chemicals

combining fire-resistant and preservative qualities; and emphasis is laid on the need for standard instructions for the fire-proofing of wood.

33.36.3. *Seasoning. Drying*

33.36.3. BOISFONTAINE, A. S. **Fundamentals of good stacking for the effective air-seasoning of lumber.** *Sth. Lumberm.* 165 (2071), 1942 (55–9). [Southern Pine Inspection Bureau.]

33.36.3. HUDSON, M. S. **Drying wood and wood products.** *U.S. Patent* No. 2,273,039, Feb. 17, 1942. Chem. Abs. 38 (3654). P.R.

33.36.3. RIECHERS, K., and IGNEY, M. Erfahrungen über Vakuumholztrocknung. **[Experiences in the drying of wood in a vacuum.]** *Holz* 4, 1941 (413–9). [G.g.] P.R.

The tests described gave negative results. Seasoning was slow and uneven. Only boards in immediate contact with heating surfaces or directly exposed to heat rays dried quickly and well.

33.36.3. TENGER, C. G. **Treatment of green logs with sugar solutions.** *U.S. Patent* No. 2,271,212, Jan. 27, 1942. Chem. Abs. 36 (3654). P.R.

A treatment is employed which involves applying to the end of a freshly cut green log a sugar solution having osmotic action on the wood and causing the solution to travel through the log toward its opposite end while maintaining the temperature of the solution below that which would cause appreciable swelling of the wood fibres and obstructions to penetration of the solution.

33.36.3 (68). SCOTT, M. H. **Timber seasoning in South Africa.** *J. S. Afr. For. Ass.* No. 8, 1942 (70–102 + plates).

An outline of the fundamental principles involved in the seasoning of wood, together with explanatory notes on air and kiln seasoning, including descriptions of the most common types of kiln at present in use. Seasoning defects are described, and notes are given on the characteristic seasoning behaviour of the more common timbers.

33.36.3 : 01.4 : 12.25. **Pine laboratory discovers new lumber seasoning method.** *Timberman* 43 (11), 1941–42 (52–4, 77). [Western Pine Association Research Laboratory.]

The method described makes use of a solvent which removes resin and oils as well as water from the wood. Experimental results show that green Ponderosa Pine sapwood (pieces 4 in. × 2½ in. × 18 in.) can be 'dried' to 10 per cent. moisture content in 24 hours while heartwood takes a little longer. After treatment the wood was much lighter in colour than corresponding air- or kiln-dried pieces, it had a marked ability to absorb liquid materials such as preservatives, etc., there was no checking, and the knots did not have their usual oily appearance.

33.36.3 : 12.25. MOTTET, A. L. **Kiln drying investigations.** *Timberman* 43 (10), 1941–4 (15–16, 54, 56–58). [West Coast Lumbermen's Association.]

The investigations described were carried out on a large scale under normal commercial conditions using 2-in. Douglas Fir boards. Results obtained indicate that in most cases sapwood segregation has no advantage; where the quantity of boards with more than one-quarter sapwood volume is considerable, it is often preferable to air-dry these boards for 2–6 weeks and then to kiln-dry them with the heartwood pieces. No evidence was found of correlation between the magnitude of the seasoning degrade and the temperatures and humidities employed. Nor was there any indication of greatly increased seasoning degrade at a final moisture content of, say, 12 per cent., as compared with the normal final moisture content of about 20 per cent. However, drying to the lower moisture content is more costly, and it is doubtful whether it is economical.

33.36.3 : 31.2. PETTIFOR, C. B. **Seasoning timber. Effects of seasoning on the mechanical properties of timber.** *Wood* 7, 1942 (177–9).

The improvement of the mechanical properties of timber with decreasing moisture content in the moisture range below fibre saturation point is discussed, and a table is included giving for a number of British-grown timbers and for Baltic Redwood the values of the various mechanical properties at 15 per cent. moisture and the corrections for changes in the moisture content over the range 12–18 per cent.

33.36.3 : 31.8. MOTTET, A. L. **How to reduce seasoning degrade of difficult-to-dry lumber items during the summer.** *W. Cst. Lumberm.* 69 (8), 1942 (36–7).

Description of the water-sprinkling system employed by Clark & Wilson Lumber Company, Linnton, Oregon, for the protection of timber from severe air-drying during the period between sawing and kiln seasoning.

33.36.3 : 33.12 : 12.26–8. BROPHY, M. J. **Preparing and kiln-drying Maple for rifle furniture.** *Timber of Canada* 3 (1), 1942 (70, 72). [Dominion Forest Service.]

33.36.3 : 33.31. **New development in handling of green lumber.** *Sth. Lumberm.* 165 (2073), 1942 (46).

From preliminary tests it appears that the addition of starch (preferably edible grades of corn starch) to urea-water solutions makes it possible to apply the latter to the ends of logs and boards as a protection against splitting and checking while drying. A satisfactory composition may be made by adding 6 per cent. starch, by weight, to a 40- to 50-per-cent. solution of urea in water.

33.36.3 : 33.31. PECK, E. C. **The hygroscopic and antishrink values of chemicals in relation to chemical seasoning of wood.** Forest Products Laboratory, Madison, Wis. *Mimeo.* No. *R*1270, 1941. pp. 6 + tbls.

Of the chemicals and mixtures studied, the ones that showed the most promise for use in the chemical seasoning of wood, both from the standpoint of relative humidity and antishrink, and at the same time lacked undesirable properties, were urea, invert sugar, and a mixture of invert sugar and urea. *From author's summary.*

33.36.3 : 33.53. **Seasoning of small poles—a novel method.** *Mon. News Lett. Div. For. Prod. Aust.* No. 125, 1942 (1).

Small logs of Southern Blue Gum (*Eucalyptus globulus* and *E. bicostata*), from which a central core of half the diameter of the log had been bored, could be seasoned without degrade under quite severe conditions, the treatment relieving the seasoning stresses. It is suggested that for poles and posts the interior of the surface might be treated with preservative, thus enabling the use of naturally non-durable timbers.

33.36.3 : 33.53 : 12.25. SEGELKEN, J. G. **Kiln drying Southern Pine poles.**—With discussion. *Proc. Amer. Wood Pres. Ass.* 38, 1942 (251–62).

Results from a series of experiments on kiln drying of Southern Pine (*Pinus palustris* and *P. echinata*) poles indicate that such poles can be dried in about four days, and that they can be satisfactorily treated with creosote in about 4-hr. cylinder time. Further investigation is required to determine the most economical temperature and humidity schedules and the effect of practical stickering, proper baffling, and increased circulation.

33.38. Charcoal Manufacture. Use of Wood and Charcoal in Producer-Gas Generators

33.38.1 : 07.7. BOUVIER, H. **Oven for carbonizing wood.** *Swiss Patent* No. 216,147, Dec. 1, 1941 (Cl. 12*a*). Chem. Abs. 36 (3662). P.R.

33.38.1 : 07.7. BOUVIER, H. **Portable oven for carbonizing wood.** *Swiss Patent* No. 216,148, Nov. 17, 1941 (Cl. 12*a*). Chem. Abs. 36 (3662).

33.38.1 : 07.7. BROULHIET, G. **Installation for carbonizing wood.** *Swiss Patent* No. 217,172, Jan. 5, 1942. Chem. Abs. 36 (3662). P.R.

33.38.1 : 07.7. PAHUD, A., & CIE. **Wood carbonizer.** *Swiss Patent* No. 216,367, Dec. 1, 1941. Chem. Abs. 36 (3662). P.R.

33.38.1 : 07.7. BOURQUIN, A. Die Holzverkohlung in Meileröfen. Eine praktische Anleitung. **[Carbonization of wood in kilns: A practical introduction.]** Schweizerischer Verband für Waldwirtschaft, Solothurn. 1941. pp. 32. [G.]

With reference to the manufacture of producer charcoal using the Swiss-made portable kilns 'Keller-Trüb', 'Ama', and 'Autostop', of which the first-named has a capacity of 4·5 cu. m. and the other two a capacity of 3·8 cu. m.

33.38.1 : 07.7. BOUVIER, H. **Automatic, portable oven for carbonizing wood.** *Swiss Patent* No. 215,896, Nov. 1, 1941 (Cl. 12*a*). Chem. Abs. 36 (3662). P.R.

33.38.1 : 33.37 : 07.7. ZORN, R. **Apparatus for carbonizing and distilling wood.** *Swiss Patent* No. 216,642, Dec. 16, 1941 (Cl. 12*a*). Chem. Abs. 36 (3662). P.R.

33.38.1 : 33.37 : 33.39. MILLOT, R. Eine Lösung des Problems der industriellen Holzdestillation im Walde: Der Turpin-Ofen. **[A solution of the problem of industrial wood distillation in the forest: the Turpin kiln.]** *Rev. Agriculteurs France* 73, 1941 (210–1; 300–2). [F.] *Chem. Zbl.* 113, II, 1942 (485). D.S.I.R. (R.S.)

The first paper describes the portable charcoal kiln constructed by F. Turpin. Production is continuous, tar and raw wood vinegar being manufactured in addition to charcoal; the waste gases are utilized in the heating of the retort. The second paper includes an account of industrial tests with the Turpin kiln. The design of the kiln has been improved slightly with a view to a better utilization of the by-products of charcoal manufacture.

33.38.1 (945) : 33.38.2. **Victoria Government scheme . . . for stepping up charcoal production.** *Aust. Timb. J.* 8, 1942 (733, 735).

Charcoal produced by farmers and others is bought by a central Government agency and retailed after grading and bagging.

33.38.1 : 33.38.2. RAMASWAMI, S. **Some factors affecting the quality of charcoal for producer gas plant.** *Indian For. Leafl.* (*Chemistry*) No. 18, 1942. pp. 6. [Forest Research Institute, Dehra Dun.]

Factors discussed briefly include ash content, moisture, volatiles, density, size, packing, hardness and cleanliness.

33.38.1 : 33.38.3. AREND, A. G. **Charcoal black. An improved design for a continuous furnace.** *Paint Technol.* 7, 1942 (93). P.R.

33.38.2. ATCHERLEY, J. R. **Charcoal briquets.** *Australian Patent* No. 114,035, Oct. 13, 1941. Chem. Abs. 38 (3661). P.R.

Description of the method of preparing briquettes of ground charcoal for use in producer-gas generators.

33.38.2. ALLCUT, E. A. **Producer gas for motor transport.** *Tech. Memor. Sch. engng. Res., Toronto* No. 1, 1942. pp. 8. [*Repr.* from *Engineering Journal*, April, 1942.] I.F.B.

A general article summarizing data from 35 recent publications on portable gas producers.

33.38.2. **Producer gas plant for industrial purposes. Its operation and maintenance.** The National Federation of Gas Coke Associations, 1, Grosvenor Place, London, S.W.1. 1942. pp. 86. I.F.B.

This book is a comprehensive guide to the use of producer gas in the heating of furnaces and industrial gas appliances. Its eight sections deal with:—(1) gas production, including theory of producer gas, producer fuels (only mineral fuels being dealt with, since only these are commonly used in Great Britain), and gas composition; (2) the generator; (3) the cleaning and cooling apparatus; (4) fans, boosters, and gas pressure control; (5) plant control instruments and gas analysis; (6) sulphur removal; (7) utilization of producer gas, with special reference to the heating of furnaces and industrial gas appliances; and (8) typical producer-gas plants, including descriptions of six plants of British make. A section dealing with precautions against carbon monoxide poisoning and the treatment of casualties is appended. The book is well illustrated and contains much that is of interest to users of stationary producers, whatever the type of fuel employed.

33.38.2 : 01. RUEDY, R. **Wood and charcoal as fuel for vehicles.** National Research Council of Canada, Ottawa. *N.R.C.* No. 1074, (revised ed.) 1942. pp. iii + 106 + plates. [Research Plans and Publications Section.] E.F.A.

The bulletin comprises a general and a bibliographical section. The former includes:—(1) An account of official tests on producer-gas-driven vehicles that have been conducted in France, Switzerland, Austria, Germany, Sweden, Great Britain, Australia, Canada, and several other countries, with supplementary notes on experience gained, and official action taken, in some of these countries. This is the most detailed and probably the most useful section of the general part of the bulletin. (2) A brief discussion of the process of producer-gas manufacture. (3) General notes on the design and construction of producers. (4) Descriptions of various makes (mainly of foreign design) of wood-gas and charcoal-gas producer. (5) Summaries of Swedish and Swiss specifications for producer fuelwood, and of a Swedish specification for producer charcoal. (6) A discussion of the use of producers in transport by rail and water. The bibliographical part comprises some 300 classified references, many of which are followed

by an abstract. The bulletin includes over 30 photographs and diagrams.

33.38.2 : 07.7. SCOTT, J. D. **Mobile gas producer units.** *Farm & Forest* 3, 1942 (64–7).

A brief note on the basic design and operation of producer-gas units, followed by the description of a simple unit that could be manufactured cheaply in Nigeria.

33.39. Manufacture of Sugar, Oils, Alcohol, and Vinegar from Wood

33.39 : 12.25. FAUCOUNAU, L. **Obtaining sugars and ethyl alcohol from the wood of the Maritime Pine.** *Rapp. et commun. sur pin maritime, 62e Congr., Arcachon, 22–27 Sept., 1938*, 1939 (151–8); *Chimie & industrie* 45, 1941 (619). Chem. Abs. 36 (3663). P.R.

33.39 : 34.6 : 33.32. **D-ribose from sulphite liquor.** *Pulp Paper Mag. Can.* 43, 1942 (786).

D-ribose, a rare sugar that is needed to make vitamin B2 (riboflavin), can be obtained in large quantity from the liquor waste of sulphite pulp mills.

33.5. *Pitprops, Sleepers, Poles and Other Roughly Converted Wood*

33.52 : 12.26–8 : 33.36.1. BURTON, W. J. **Use of Gum ties on the Missouri Pacific.**—With discussion. *Proc. Amer. Wood Pres. Ass.* 38, 1942 (238–50).

Cross-ties of *Nyssa* spp. and *Liquidambar styraciflua* should give good service provided that measures are taken to minimize the risk of infection before the wood is seasoned and treated. Of these species Red Gum is the least desirable for ties owing to the extreme resistance of its heartwood to the penetration of preservatives. Black and Tupelo Gums are particularly suitable, as their heartwood is easily penetrated, and their crossed and interlocked grain prevents splitting, thus making it unnecessary to use anti-splitting irons.

33.6. *Packing Boxes, Crates, etc.*

33.6. HEINRICH, H. Austauschverpackungen aus Holz oder Holzabkömmlingen. **[Substitute packing materials from wood or wood products.]** *Holz* 4, 1941 (432–4). [G.] P.R.

Notes on the use of wood products as substitutes for metal in the German container and casing industry.

33.7. *Firewood*

33.7 : 01.4. KNUCHEL, H. Vom Heizen mit Holz. **[On heating with wood.]** *Schweiz. Z. Forstw.* 93, 1942 (180–6 + plates). [G.]

Includes drawings and photographs of modern wood-fueled tile stoves of Swiss design.

33.7 : 07.7 : 33.38 : 31.24. **How to burn wood: New methods and new markets.** *Conn. For. & Park. Ass. Publ.* No. 33d, (revised ed.) 1942. pp. 24.

This pamphlet describes methods and equipment for use in the burning of wood as a fuel, with special reference to conditions in Connecticut. Improved wood stoves are discussed in some detail.

33.8. *Other Manufactured Products*

33.8 : 12.26–8. GARLAND, H., and MARION, L. **California Manzanita for smoking pipes.** *Tech. Note Calif. For. & Range Exp. Sta.* No. 18, 1942. pp. 10 + plates.

A discussion of the possibilities of using the roo burls of California Manzanita (*Arctostaphylos* spp.) fo the production of pipe blocks now that the tree heath (*Erica arborea*) is no longer available to the America market.

33.9. *Grading and Storage of Converted Timber*

33.9 : 33.4 (410). **British standard grading rules for structural timber for purposes where the stresses in timber are known.** *British Standard* No. 940 (Part 2) 1942. pp. 35. British Standards Institution, 28 Victoria Street, London.

33.9 : 33.4 (54) : 31.27 : 31.8. LIMAYE, V. D. **Safe working stresses for some important Indian timbers.** *Indian For. Leafl.* (*Utilisation*) No. 13, 1942. pp. 11. P.R. [Forest Research Institute, Dehra Dun.] P.R.

Some common Indian structural timbers are classified into three grades, depending on the incidence of defects, and safe working stresses are given for each grade.

33.91 : 33.4 : 12.25 (79). **Standard structural grades of Douglas Fir conforming to Standard Grading Rules No. 11, April 1, 1942 of the West Coast Bureau of Lumber Grades and Inspection.** West Coast Lumbermen's Association. Seattle, Wash. 1942. pp. 4.

33.91 : 33.4 : 12.25 (79) : 98.3. **Grade-use guide for buildings and other structures applicable to Standard Grading Rules, West Coast Bureau of Lumber Grades and Inspection for Douglas Fir, West Coast Hemlock, Western Red Cedar, Sitka Spruce.** West Coast Lumbermen's Association. Seattle, Wash. 1942. pp. 11.

33.91 : 33.4 : 12.25 (79) : 98.3. **Standard grading and dressing rules for Douglas Fir, Sitka Spruce, West Coast Hemlock, Western Red Cedar lumber. West Coast Bureau of Lumber Grades and Inspection. Effective April 1, 1942.** West Coast Lumbermen's Association, Seattle, Wash. No. 1 . 1942. pp. iii + 153.

34. MINOR FOREST PRODUCTS AND THEIR UTILIZATION

34.2. *Vegetable Products*

34.2 : 98.1 (66.9). MACKAY, J. H. **Wild products from Nigeria: their wartime importance.** *Farm & Forest* 3, 1942 (67–72).

Products for which there has been a greatly increased war-time demand include wild rubber [cf. *For. Abs.* 4 (122, 183)], wild silk [cf. *For. Abs.* 4 (184)], kapok, fibres, and copal resins, mainly of 'fossil' origin. Further possibilities are suggested for the use of locally grown materials as substitutes for those normally imported. [Cf. *For. Abs.* 3 (330).]

34.21. Fodder Grass and Grazing

34.21 (75.6). BISWELL, H. H., and FOSTER, J. E. **Forest grazing and beef cattle production in the coastal plain of North Carolina: results of a survey of 100 cattle producing farms.** *Bull. N. Carolina agric. Exp. Sta.* No. 334, 1942. pp. 22. P.R.

Suggestions are made for increased grazing on forest lands in the coastal plain of North Carolina. At present these lands furnish 29 per cent. of the feed of local beef cattle, but there are still many forest areas containing nutritious native forage which are ungrazed. Such development, under proper management, would

not only increase the returns from these lands but also reduce the forest fire hazard.

34.24. Tanning Materials. Cork

34.24 : 12.25. FRIEDMAN, L., and EZELL, A. F. **Cork from Douglas Fir bark.** *Timberman* 43 (11), 1941–42 (26–7). [Oregon Forest Products Research Laboratory, Corvallis.]

By controlled drying and the use of special processing methods a cork of high quality has been obtained from Douglas Fir bark, and high yields (50 per cent. and up) of ground cork are reported.

34.24 : 12.26–8 : 12.14.8. TAYLOR, A. J. **Grading and sampling of Wattle bark.** *J. S. Afr. For. Ass.* No. 8, 1942 (103–11 + plates).

Mainly a discussion of methods of grading consignments of bark for export and of methods of drawing samples for chemical analysis.

34.25. Medicinal Plants

34.25 : 12.26–8. GONÇALVES CARNEIRO, J. A introdução e a aclimação de plantas contra a lepra. [**The introduction and acclimatization of plants yielding medicines employed in the control of leprosy.**] Secretaria da Agricultura, Indústria e Comércio de Estado de São Paulo. 1941. pp. 40. [Port.]

Prospects for the large-scale cultivation in Brazil of medicinal plants used in the control of leprosy (chiefly *Carpotroche* and *Hydnocarpus* spp.) are considered to be satisfactory.

34.25 : 12.26–8. KRISHNA, S., and VARMA, B. S. **A note on the active principles of *Embelia robusta*, Roxb., *Myrsine semiserrata*, Wall and *M. capitellata*, Wall.** *Indian For. Bull.* (*n.s.*) *Chemistry* No. 102, 1941. pp. 3. [Forest Research Institute, Dehra Dun.]

34.25 : 45.3 : 12.26–8 (54). GHOSE, T. B. **A note on *Derris* and other rotenone bearing vegetable insecticides, their occurrence and possibilities of cultivation in India.** *Indian For. Leafl.* (*Chemistry*) No. 20, 1942. pp. 9. [Forest Research Institute, Dehra Dun.]

Species indigenous to India in which rotenone has been found include *Derris ferrugenea*, *Millettia pachycarpa* and *Tephrosia candida*. Several localities in India are suitable for the cultivation of richer varieties of derris such as *D. elliptica* or *D. malaccensis*, indigenous to Malaya.

34.26. Resin. Turpentine. Oils. Gums. Rubber. Gutta Percha

34.26. DAWSON, T. R. **Planting and production of raw rubber and latex, gutta-percha, balata, chicle and jelutong.** *Annu. Rep. Prog. Rubber Technol.* 5, 1941 (5–11). L.S.

34.26. NEW YORK. **Sixtieth annual report for the fiscal year ended June 30, 1941, with meteorological records for 1883 to 1940, inclusive.** N.Y. State Agricultural Experiment Station, Cornell University, Geneva, N.Y. 1942. pp. 84. A.P.B.

The lead content of Maple syrup can be reduced from up to 10 parts per million to a few tenths of a part per million by clarification alone, either by settling, filtering or with milk. The complete removal of lead from sap is possible by the use of base exchange units when once the exact relation of volume of zeocarb to volume of sap flow can be determined (p. 21).

34.26. PUNTAMBEKAR, S. V. **A substitute wax for carnauba.** *Indian For. Leafl.* (*Chemistry*) No. 19, 1942. pp. 3. [Forest Research Institute, Dehra Dun.]

A method is given for preparing a satisfactory substitute from indigenous materials including shellac wax, bees' wax and Sal dammar.

34.26 (66.9). MACKAY, J. H. **Rubber.** *Farm & Forest* 3, 1942 (53–6).

A brief account of the history of rubber production in Nigeria. Some indigenous plants produce inferior rubber having a high resin content, while the one indigenous rubber-yielding tree known in West Africa (*Funtumia elastica*) and some forest vines yield excellent rubber. The yield of dry rubber per acre from *Funtumia* is under 60 lb. while that from *Hevea* may be 300 lb. or more. The latter species was introduced into Nigeria in 1894, and in 1938 the export of plantation rubber was 3,100 tons while that of wild rubber was negligible. The objective at present is the maximum yield of plantation rubber to be supplemented by all the wild rubber that can possibly be collected.

34.26 (54.87) : 12.26–8. O'BRIEN, T. E. H. **Rubber investigations in Ceylon.** *Emp. J. exp. Agric.* 10, 1942 (61–76 + plate). A.P.B.

An account of the work of the Rubber Research Scheme, Ceylon, particularly that of the Botany and Mycology Department, and more briefly of the Soils, Chemical and Small-holdings Departments.

34.26 : 12.25. PETROV, M. **Basic physico-chemical constants of rosin from several Firs.** *J. Applied Chem.* (*U.S.S.R.*) 14, 1941 (609–11). [R.] Chem. Abs. 36 (3688). P.R.

34.26 : 12.25. REDDISH, G. F. **The disinfecting value of Pine oil emulsions.** *Soap and Sanit. Chem.* 17 (9), 1941 (88–90). E.S.R. 87 (396).

34.26 : 12.26–8 (66.4). **Po-yok fruits from Sierra Leone.** *Bull. Imp. Inst., Lond.* 40, 1942 (99–103).

Experiments indicate that the oil obtained from the kernels of the Po-yok tree (*Afrolicania elaeosperma*) has valuable varnish and paint-making properties and is generally superior to linseed oil but not equal to tung oil.

34.26 : 33.32 : 12.25 (921) : 56 : 57. MOON, D. G. **Development of naval stores and pulpwood supplies from the *Pinus mercusi* of northern Sumatra.** *Paper Tr. J.* 114 (16), 1942 (34–7). P.R.

A brief history is given of the investigations leading to the development of second-growth forests of *P. mercusi* for the production of resin and turpentine and to the proposal in 1941 for the establishment of a sulphate mill with a daily capacity of 150 tons. The area under consideration, totalling 280,000 acres, was expected to yield 90,000 tons of rosin and turpentine per year and pulpwood from thinning operations to the extent of 1 cord per acre each year. Thinnings can be cut, peeled, piled and left in the plantation to dry sufficiently to float to the mill without much deterioration.

Experimental work has shown that there is a definite ratio between rate of growth and yield, which can be controlled by proper thinning, and that yield is a function of the growth of branches as well as of the stem.

34.27. Seeds. Fruits. Leaf Fodder

34.27 : 11.47.12 : 33.0 : 12.26–8. KERR, G. R. G. **Gawo: the ideal farm tree.** *Farm & Forest* 3, 1942 (72–5).

Gawo (*Acacia albida*) is found mainly on farmlands and on the sites of abandoned villages. Leaves and fruits provide excellent forage for stock in the dry season. It is leafless while crops are growing, and its leaf-fall provides a valuable top dressing to the soil at the time cereal crops are sown. The tree develops a very long tap root and draws its moisture from the subsoil. The wood is used for canoes and articles in local use, and is very susceptible to attack by borers and termites. The characteristics of the tree are described briefly.

34.27 : 12.14.4. LIESE, J. Verwendung von Feinreisig zur Viehfütterung. **[Thin branchwood for fodder.]** *Dtsch. Forstwirt* No. 19/20, 1942. [G.] *Abstr.* in *Forstarchiv* 18, 1942 (155). [G.]

The branches should preferably be less than 1 cm. in diameter, and should be thoroughly minced in a chaff. Fermentation for three days in a 1-per-cent. malt solution and vinasse slops, etc. increases the quality of the product. Both dried summer branches with leaves and fresh leafless branches may be fed during the winter. 'Soft' hardwoods such as Lime, Poplar, Aspen, and Birch are generally most suitable; those of *Robinia* have the highest nutritive value. Branches of 'hard' hardwoods and of softwoods may also be used. Branchwood fodder is a good substitute for hay of medium quality.

34.27 : 12.26–8 (54.6) : 45.3. FOTIDAR, M. R. **Willow as a winter sheep fodder in Kashmir.** *Indian Farming* 3, 1942 (135–6 + plate). I.F.B.

Dry Willow leaves are used as winter fodder for sheep and goats in the Kashmir valley, the main species being *Salix fragilis*, *S. babylonica*, and *S. alba*. In addition, Willow shoots are used in basket making, the timber is used as a cheap fuel and that from straight trunks over 15 years old is used in the manufacture of cricket bats, tool handles, troughs, and sandals. The Willows are lopped every second year in order to obtain fodder and new plantation material and also to control the San José scale (*Aspidiotus perniciosus*).

34.27 : 12.26–8 : 11.62.11 : 33.06. HEWITT, A. C. T. **Live stock notes.—Weeping Willows.** *J. Agric., Victoria* 40, 1942 (178–9). L.S.

Salix babylonica provides summer shade for stock and is an excellent green feed for both stock and poultry. It is also useful in preventing soil erosion and the wood makes a good but quick-burning fuel.

34.3. *Products of the Animal Kingdom*

34.3 (66.9). TAYLOR, J. E. **Honey and beeswax production at Zaria.** *Farm and Forest* 3, 1942 (11–14).

The increased native production of honey, and particularly of beeswax for the export market, is being encouraged, and an improved type of hive has been introduced. The seasons for collecting honey at Zaria are April–June and October–November. Trees most favoured for hives are *Ficus gnaphalocarpa*, *Vitex cuneata*, *Parkia filicoidea*, *Tamarindus indica*, *Sclerocarya birroea*, *Daniellia oliveri* and *Entada sudanica*.

34.3 (66.9). GOLDING, F. D. **The wild silkworms of Nigeria.** *Farm and Forest* 3, 1942 (35–40).

Nigerian 'Anaphe' silk is used locally for cloth and embroidery yarn and has recently been used for the manufacture of parachutes and for other war purposes. The commercial history of 'Anaphe' silk is outlined, and the possibility of establishing plantations of suitable food plants for the rearing of silkworms is discussed. The main species of *Anaphe* recorded in Nigeria together with their known larval foods plants are:

A. infracta	*Bridelia micrantha*; *Albizzia* sp.
A. moloneyi	*Isoberlinia doka*; *Ficus platyphylla*; *Albizzia gummifera*; *A. zygia*
A. venata	*Triplochiton scleroxylon*
A. ambrizia	*Bridelia ferruginea*
A. vuilleti	*Ficus platyphylla*

The highest quality of silk in the north is obtained from a silkworm on *Tamarindus indica*; silkworms are also found on other species of *Ficus*, on *Uapaca guineenis*, and on *Afrormosia laxiflora*. There are indications, however, that the various species of *Anaphe* may not be monophagous, and may be reared on a variety of food plants.

34.3 (66.9). GOLDING, F. D. **The wild silkworms of the northern provinces of Nigeria.** *Farm and Forest* 3, 1942 (147–50).

The eight species described, together with their larval food plants, are as follows:—1. *Anaphe moloneyi* on *Isoberlinia doka*; 2. *A. ambrizia* on *Afrormosia laxiflora* and *Terminalia avicennioides*; 3. *A. vuilleti* on *Tamarindus indica*; 4. *Paradrallia* sp. novum on *Afrormosia laxiflora*, possibly also on *Prosopis africana* and *Crossopteryx febrifuga*; 5. *Gastroplakaeis rufescens* on *Isoberlinia doka*; 6. an unidentified Saturniid moth on *Ziziphus mauritiana* and *Z. spina-christi*; 7. 'Tsamia gaude' on *Gardenia triacantha*; and 8. 'Tsamia baure' on *Ficus gnaphalocarpa*. The silk of *A. moloneyi* has been exported to a considerable extent in the past and that of *A. vuilleti* is known to be of good quality. The other types of silk are either unlikely to be of commercial value or are not used much locally. The silk of *A. moloneyi*, *A. ambrizia* and *A. vuilleti* is acceptable to the Ministry of Supply.

34.6. *Utilization of Logging and Milling Waste*

34.6 : 33.06. **Fuel from sawmill refuse: production and transportation costs.** *Timberman* 43 (12), 1941–42 (29–31).

This note summarizes the results from a recent survey made in Oregon of the cost of production, loading and transportation of different types of fuel produced from sawmill refuse. It was found that barges, where available, are most economical for hauling large quantities of wood fuel, rail transportation is more economical than trucks on long hauls, and larger trucks give a lower per unit hauling cost than small ones although the latter have certain advantages of mobility and manoeuvreability.

34.6 : 33.02 : 32.7. WACKERMAN, A. E. **Pulpwood from logging operations.** *Sth. Lumberm.* 165 (2075), 1942 (51–3).

In Pine stands of the southern States pulpwood can be produced profitably from saw-timber stands by using tops that are free of knots together with the wood from salvage and early thinning operations. Such utilization, if properly managed, has a beneficial effect on the growth and quality of trees reserved for saw timber.

34.6 : 33.06 : 07.7. LUCAS, A. **Sawdust and chippings collection combining refuse disposal and heating.** *J. Instn. Heat. Vent. Engrs.* 9, 1941 (211–27).

Description of a semi-automatic process of the plenum type for the utilization of collected refuse for heating purposes. The cost is comparable with that of an ordinary heating system. Details of the plant are given, with various calculations pertaining to its use.

34.6 : 33.06 : 07.7. WEST, R. F. **Waste products as a fuel equivalent.** *J. Instn. Heat. Vent. Engrs.* 9, 1941 (228–36).

An account of the value of refuse as an economic fuel equivalent when burnt under proper conditions, and the description of types of plant which will give efficient results.

34.6 : 33.32 : 33.39 : 34.24. BENSON, H. K. **Potential wood chemical industries of the Pacific coast.** *Timberman* 43 (10), 1941–42 (10–11, 28). [University of Washington.]

The fermentation of the sugars from waste liquors of sulphite mills for the production of alcohol to be used as a basis for synthetic rubber, the utilization of wood waste for carbon products, and the extended use of Hemlock bark as a source of tannin are the main points discussed.

34.6 : 33.32 : 33.39. GRANT, J. **Chemicals from wood.** *Mfg. Chem.* 13, 1942 (74–9).

A general article. All the uses that have been found for wood waste, even those inspired by war economics, failed to turn to account the vast accumulations of waste in wood-using industries, and most of these waste products are still disposed of by burning. In his examination of the possibilities of wood as a starting point of chemical production, the author discusses the methods of isolating lignin, the utilization of the digested liquors obtained in pulp manufacture, and various processes of promise, such as saccharification.

34.6 : 33.32. SOY, F. A. **Waste into production in newsprint operation.** Technical Section, Canadian Pulp & Paper Association, Montreal. 1940. pp. 4. [Price Brothers & Co., Ltd.]

A report on results obtained in the reduction of waste in pulp production by the use of additional equipment and by improving methods of operation.

34.6 : 33.7 : 33.32 : 33.39. BROWNLIE, D. **Developments in wood technology.** *Engineering* 150, 1940 (461–2, 502–4).

Chiefly notes on the process of sawdust briquetting by direct high compression without a binder as adopted by Messrs. Potlatch Forests Inc., of Lewiston, Idaho, and on the Masonite process, with and without recovery of sugars.

38. FOREST CONSTRUCTIONAL WORKS. ENGINEERING

38.2. GREAT BRITAIN. **Economy of timber in building.** *Wartime Bldg. Bull. D.S.I.R.* No. 19, 1942. pp. 16.

The bulletin discusses ways in which economy can be achieved in the use of timber in building. Recommendations for the guidance of designers, manufacturers, and contractors are set out.

38.2. MINISTRY OF WORKS AND PLANNING. **Timber Economy No. 3 (Fitments).** H.M. Stationery Office. 1942. (32 plates).

Detailed drawings showing forms of economical construction for racks, shelving, bins, cupboards, and fitments.

38.3. BIELIGK, O. Das Holz im Kriegsbrückenbau. **[Wood for military bridge construction.]** *Holz* 4, 1941 (425–32). [G.g.] P.R.

A general discussion. The wide use of wood in military bridge building is due less to its technical qualities than to its general availability and ease of handling, and to the relative simplicity of construction in wood.

38.3 : 07.7 : 43.1. **Doing big things with little machines. Baby tractor, narrow tread truck and portable compressor designed for special work by Forest Service.** *Timberman* 43 (12), 1941–42 (38, 40, 42).

Description of new specialized equipment evolved by the U.S. Forest Service for constructing and using narrow, relatively cheap truck roads, thus making fire-fighting facilities readily available over a much wider area than would be economically possible with standard roads and equipment.

38.3 : 12.25. **Highway structures of Douglas Fir.** W. Coast Lumbermen's Association, Seattle. 1942. pp. 40.

Annotated designs illustrating the use of Douglas Fir timber in the construction of guardrails, culverts, roadways, bridges, etc.

38.62. **Wood ousts metal in new culvert.** *Mon. News Lett. Div. For. Prod. Aust.* No. 125, 1942 (4).

With reference to a sectional, octagonal-shaped wood pipe, developed to meet war-time needs, that is fabricated from lumber of various sizes according to load requirements and fastened together with wood dowels. Units 12 ft. or more in length are joined up in the field to form a single, flexible structure.

38.8 : 33.36.1. **Timber cribbing for retaining walls.** *Wood Pres. News* 20, 1942 (46–50). P.R.

Advantages in the use of crib retaining walls, precautions to be observed in their use, and important factors in their design are noted.

4. FOREST INJURIES AND PROTECTION

4 : 23.27 : 21.64. WELCH, D. S. **The diagnosis of shade tree troubles.** *Proc. nat. Shade Tree Conf.* 17, 1941 (45–50). [Cornell University.]

Unfavourable environmental factors, together with fungous, bacterial and virus diseases are among the agents responsible for shade tree troubles. The symptoms may be either localized or general; and for the intelligent diagnosis of the trouble it is necessary to have an accurate knowledge of the species under consideration, its age or size, the appearance of its foliage, twigs, larger branches, trunk and roots, and environmental conditions, past and present, including soil, climate, slope and exposure, and artificial environmental changes.

42. INJURIES FROM INORGANIC AGENCIES, EXCLUDING FIRE

42.1. *Air Currents*

42.1 : 12.25 : 21.61. ZENTGRAF, E. Sturmeinwirkungen auf Fichtenbestände. **[The effects of storms on Spruce stands.]** *Allg. Forst- u. Jagdztg.* 118, 1942 (268–70). [G.]

The ends of Spruce branches are often broken off in

large numbers as a result of whipping by narrow-crowned trees swaying during storms. A stand in the Black Forest that was damaged in this way during a recent storm was found to have lost about one-fifth of its needle surface.

42.1 : 34.26 : 57 : 11.12. GOMES, A. O ciclone e a produção das matas portuguesas. Presumível influência sôbre a secreção resinosa, em especial. **[The cyclone [of 15th February, 1941] and the production of Portuguese forests, with special reference to a probable influence on resin secretion.]** *An. Inst. sup. Agron. Lisboa* 11, 1940 (217–24). [Port.]

The decrease in resin yield observed in the season following the cyclone is attributed to the mechanical damage suffered by many trees, notably root damage and defoliation.

42.1 : 56 : 12.25 : 12.26–8 : 11.12. MITSCHERLICH, G. Der Einfluss des Seewindes auf das Wachstum von Kiefer, Fichte, Buche, Birke und Erle. **[The influence of sea wind on the growth of Pine, Spruce, Beech, Birch and Alder.]** *Thar. forstl. Jb.* 93, 1942 (345–73). [G.g.]

An account is given of observations on the influence of sea wind on the height growth, crown development, diameter growth, stem form, and rooting of Pine, Spruce, Beech, Birch, and Alder. Despite its well-known resistance to storm, Scots Pine is very sensitive to permanent exposure to strong wind. The leading shoots of the trees on the windward border of the stand are easily killed, and the lateral shoots taking their place soon give way to the wind and bend towards the interior of the stand. In addition, wind causes oblique growth and the formation of compression wood, which decrease the value of the timber. As border stems are uprooted or broken, an increasing number of trees in the interior of the stand show oblique growth. Pine has few low branches, and altogether is an unsuitable species for the windward border of exposed stands. The growth of Spruce is much less influenced by exposure to wind, but, owing to the superficial rooting habit of this species, the trees are easily thrown. Beech is an ideal border tree owing to its low branching, dense crown, and numerous vertical roots. On suitable sites, Alder may also be used as a border tree. Birch, on the other hand, is less suitable. It is less storm resistant than Beech, and the Birch crowns form too loose a canopy to exclude effectively the wind from the interior of the stand.

Of the species investigated, Beech is the most sensitive to wind as regards height growth, which decreases abruptly from the interior towards the margin of the stand; Spruce and Alder are the least sensitive in this respect. The diameter of the Beech trees also decreases rapidly towards the border, while Pine shows the smallest difference in diameter between trees in the interior and on the margin of the stand.

42.2. *Temperature Influences*

42.21 : 12.26–8. ENGSTROM, H. E., and MATTHEW, L. S. **Effects of the 1940 Armistice Day freeze on Siberian Elm in the Plains country.**—With comment by C. G. Bates. *J. For.* 40, 1942 (704–8). [Prairie States Forestry Project.]

A sudden drop in temperature to 10–15° below zero and a strong north wind coming after exceptionally mild weather caused severe damage to orchard, ornamental and forest trees in the northern Plains. Many trees of *Ulmus pumila* were injured and killed, and the present article describes the type and extent of the injury and the effect of the freeze on other species. Native American trees survived without any ill effects as did the two exotics *Sophora japonica* and *Ailanthus altissima*, while many other exotics were injured in some degree. Factors that influenced the amount of injury included seed source, degree of exposure, snow cover and available moisture.

42.21 : 42.1. THOMSON, J. S., and SIMPSON, G. **The effect of severe winter conditions on plant life in the Dunedin botanical sub-district.** *J. roy. N.Z. Inst. Hort.* II (4), 1942 (73–7). L.S.

An account of damage to vegetation caused by cold weather combined with strong winds in July 1939, with a list of the main plants affected and the degree of damage sustained. Included are a number of forest tree species.

42.22 : 12.14.5 : 12.26–8. MIELKE, J. L., and KIMMEY, J. W. **A case in diagnosis. Heat injury to the leaves of California Black Oak and some other broadleaves.** *Trees, Sta. Monica, Calif.* 5 (4), 1942 (6, 12).

Evidence showed that the reddish-brown discoloration of the leaves of *Quercus kelloggii* over an extensive area of northern California in July 1941 was due to a sudden change from cool, rainy weather to high temperatures.

42.22 : 12.26–8 (68.9). NYASALAND. **Annual report of the Forestry Department for the year ended 31st December, 1941.** Government Printer, Zomba. 1942. pp. 15.

Prolonged drought caused considerable damage to plantations of *Eucalyptus saligna*, deaths occurring mainly on dry rocky sites and in plantations that were inadequately thinned (p. 5).

42.5. *Chemical Influences*

42.5 : 12.25 : 11.42.1. NEMEC, A. Zur Kenntnis der Kali- und Magnesiamangelerscheinungen bei Sämlingen und Kulturen der Kiefer. **[A contribution to the knowledge of potassium and magnesium deficiency phenomena in seedlings and plantations of Pine.]** *Forstwiss. Cbl.* 64, 1942 (160–6). [G.] [Institut für forstliche Biochemie und Pedologie der forstlichen Forschungsanstalten in Prag-Dewitz.]

In several localities in Czechoslovakia where the soil was deficient in potassium or in both potassium and magnesium, a yellowing of the needles was observed in some trees in young Scots Pine stands, and of the needle ends in some Scots Pine and Weymouth Pine seedlings. Compared with unaffected plants growing in the same locality, those that were affected showed a lower potassium and magnesium content and a higher manganese content in their needles, and sometimes in both needles and stem.

42.5 : 12.19.4. ALLARD, H. A. **Lack of available phosphorus preventing normal succession on small areas on Bull Run Mountain in Virginia.** *Ecology* 23, 1942 (345–53).

Patches of barren soil surrounded by areas of the normal plant growth forming the early stages of a climax woodland, are a feature of the Bull Run Mountain region in Virginia. Investigations by means of pot cultures and plot studies in the field suggest that the absence of normal vegetation is due to the fact that the soils are lacking primarily in available phosphorus and secondly in nitrogen. The lack of

sufficient available phosphorus has prevented invasion by nitrogen-fixing legumes.

42.5 : 23.27. LANGFORD, G. S. **Tolerance of shade trees to spray materials.**—With discussion. *Proc. nat. Shade Tree Conf.* 17, 1941 (19–30). [University of Maryland.]

42.5 : 23.27. STRONG, F. C. **Observations and recommendations for prevention and treatment of chemical injuries to ornamental plants.** *Proc. nat. Shade Tree Conf.* 17, 1941 (74–89). [Michigan State College.]

An account of the injurious effects of calcium chloride and other dust-laying chemicals to roadside vegetation, of damage to plants by the presence in the soil of certain salts used as weedkillers (particularly sodium chlorate and sodium arsenite) and by insecticides such as lead arsenate, and of plant injury resulting from too great concentrations of illuminating gas, smoke and sulphur dioxide fumes or other toxic gases. Suggestions are made for the treatment and prevention of such injuries.

43. FOREST FIRES

43.0. *Predisposing Factors and Causes*

43.0 : 07.7. McCORD, P. P. **Streamlining the R-2 fire-danger meter.** *Fire Control Notes* 6, 1942 (85, 91). [U.S. Forest Service.]

Description of a slide-rule type instrument which indicates the fire-danger rating (in Region 2, U.S. Forest Service) after the component-factor scales have been set.

43.0 : 12.25. KNORR, P. **Variations of fire-danger factors on a ranger district in the Longleaf Pine region.** *J. For.* 40, 1942 (689–92). [Southern Forest Exp. Sta.]

While conditions of cover and topography in the Longleaf/Slash Pine type of the southeastern United States are remarkably uniform, there are some variations in fire danger. The present study was made to determine the extent of these variations over an area of 384,000 acres in southern Alabama, measurements being taken at six alternative sites and the present central station, for purposes of comparison. No significant difference was found in the moisture percentage of Basswood indicators but there were highly significant differences among stations as to wind velocity and rate-of-spread index. It is suggested that a series of check anemometer readings should be made on tentative sites before establishing permanent fire-danger rating stations in this region.

43.01 : 07.7 : 43.02. JEMISON, G. M. **The measurement of forest fire danger in the eastern United States and its application in fire prevention and control.** *Tech. Note Appal. For. Exp. Sta.* No. 50, 1942. pp. iv + 59.

A revised edition of *Technical Note* No. 35 [cf. *For. Abs.* 1 (293).]

43.01 : 11.16. GISBORNE, H. T. **New lightning facts bearing on western forest fire problem.** *W. Cst. Lumberm.* 69 (8), 1942 (44). [Northern Rocky Mt. Forest & Range Exp. Sta.]

From recent research by the General Electric Company, Pittsfield, it would appear that it is the continuing type of lightning stroke, which persists for major fractions of a second, that causes forest fires, rather than the high-current discharge which lasts but a few millionths of a second and blows trees apart. The former type of stroke lasts on an average for nearly half a second.

43.1. *Protective Measures*

43.1 : 07.7. BOSWORTH, J. **Have we gone far enough in the use of airplanes?** *Fire Control Notes* 6, 1942 (95–9, 102). [U.S. Forest Service.]

The parachuting of fire-fighting crews and equipment has been tested on a relatively small scale in some of the national forest areas, with encouraging results. The author advocates a nation-wide application of the method and discusses its possible advantages.

43.1 : 09.1. GISBORNE, H. T. **Mileposts of progress in fire control and fire research.**—With comments by R. Headley. *J. For.* 40, 1942 (597–606). [Northern Rocky Mt. Forest & Range Exp. Sta.]

The author presents his own selection of the outstanding events in the development of forest-fire control in the United States.

43.1 : 12.26–8 (79.4). ROGERS, D. H. **Measuring the efficiency of fire control in California chaparral.** *J. For.* 40, 1942 (697–703). [California Forest & Range Exp. Sta.]

This study establishes a correlation between age of chaparral cover and size of fire under a given standard of protection as follows:—(1) fires of 0 to 0·24 acres will occur in cover of any age; (2) fires of 0·25 to 9·99 acres require at least 3-year-old cover; (3) fires of 10·0 to 39·99 acres require at least 7-year-old cover; (4) fires of 40·0 acres and over require at least 13-year-old cover. The study also shows that as age of cover increases above the minimum ages required for each size class, individual fires tend to become larger.

A formula has been developed, based on burnable area, that will measure more accurately the efficiency of the fire-control organization by recognizing the effects of old burns. *Author's summary.*

43.1 (71.5) : 81. MILLER, G. L. **New Brunswick's largest fire department.** *Emp. For. J.* 21, 1942 (30–4).

A brief account of recent developments in forest-fire protection in New Brunswick. Co-operation between the Forest Service and other interested and responsible bodies, the education of the public, fire-hazard research, improvements in the fire-fighting organization and the training of personnel are among the factors considered.

43.11 : 01.4. McINTYRE, R. N. **The variable lick method—an approach to greater efficiency in the construction of fire-control line.** *J. For.* 40, 1942 (609–14). [National Park Service.]

'The "variable lick method" is a progressive method of managing men through regimentation to obtain a maximum output of control line per man engaged.' The present article describes the method in some detail, outlines the organization of a 10- and 20-man crew used in applying the method, and lists its advantages and disadvantages.

43.11 : 12.26–8. HISLOP, J. **Improving fire-lines by the use of evergreen shrubs.** *Scot. For. J.* 56, 1942 (39–42).

Several evergreen shrubs (*Phyllodoce* spp., *Vaccinium myrtillus*, etc.) are recommended for fire-line planting on peaty soils.

43.12 : 07.7. BYRAM, G. M. **Filters for penetrating atmospheric haze.** *J. For.* 40, 1942 (530–2). [Appalachian Forest Exp. Sta.]

A brief account of the development and use of a

'haze cutter', an instrument consisting of a light red filter and polarizing screen, which, studies have shown, will penetrate haze to a much greater degree than any kind of colour filter used alone. Although the instrument has certain restrictions and limitations, tests indicate that it may materially increase the 'seeing power' of lookout men.

43.13 : 07.7. CHARLTON, G. C. **Experiments with fibrous water hose.** *Fire Control Notes* 6, 1942 (110–3, 123). [U.S. Forest Service.]

Description of an inexpensive, fibrous 1½-in. water hose of very light sausage casing (weight 58 lb. per mile), which is easy to extend over forest terrain and is of sufficient strength to deliver water by gravity flow over long distances.

43.13 : 07.7. CYPHER, R. D. **The Cypher hand-operated pick-up fire pumper.** *Fire Control Notes* 6, 1942 (108–9). [U.S. Forest Service.]

Description of a hand-operated pumping unit used in conjunction with tanks of 80–90 gallon capacity and carried on a lorry.

43.13 : 07.7. SANDS, W. M. **Truck tool box and stalls solve fire-tool cache problems.** *Fire Control Notes* 6, 1942 (100–102). [U.S. Forest Service.]

At Camp Wellston, Manistee National Forest, fire-fighting lorries have been equipped with combination tool boxes and lorry seats, which are designed to accommodate all tools, water cans, and back-pack pumps. The closed covers of the boxes make safe and comfortable seats for fire-fighters.

43.13 : 07.7. UNWIN, P. T. **The 'Castra' hose rolling winch and hose-laying attachment.** *Aust. For.* 6, 1942 (73–5).

43.13 : 07.7. YOUHOTSKY, M. J. **Notes on water and fire-fighting.** *Aust. Timb. J.* 8, 1942 (700–1, 711). [N.S.W. Forestry Commission.]

In view of the fact that water is scarce in Australian forests during the fire season, it is suggested that road embankments crossing gullies or paddocks should be used as dams, with provision for storage of water above the embankment. The requirements of pumping units for fire fighting in Australian forests are discussed.

43.13 : 07.7 : 12.19.3 (78.6). WERSHING, H. F. **Fire truck with chain mesh and asbestos mat drags used on the Blackfeet Indian Reservation.** *Fire Control Notes* 6, 1942 (116–23). [U.S. Indian Service.]

The use of this equipment is confined largely to grassland in fairly flat country. The chain mesh and asbestos mat drag is designed to accomplish two purposes:—(1) the chain mesh, which is in direct contact with the fuel, serves to break it up and to mix it to some extent with the dry topsoil; and (2) the asbestos mat, which is fastened over the chain mesh, excludes air from the burning material.

44. DAMAGE BY HARMFUL PLANTS. VIRUS DISEASES

44.3. *Fungi*

44.3. HORSFALL, J. G., and ZENTMYER, G. A. **Chemotherapy for vascular diseases of trees.**—With discussion. *Proc. nat. Shade Tree Conf.* 17, 1941 (7–18). [Connecticut Agric. Exp. Sta., New Haven.]

An account of the recent work carried out at the Connecticut Agricultural Experiment Station on the treatment of vascular parasites by the use of chemicals as antidotes to fungus toxins. The two diseases used in these investigations were the Dutch Elm disease and *Verticillium* sp. [Cf. *For. Abs.* 4 (57–8).]

44.3 (410) : 12.26–8 : 12.21 : 31.42.1 CARTWRIGHT, K. ST. G., and FINDLAY, W. P. K. **Principal decays of British hardwoods.** *Ann. appl. Biol.* 29, 1942 (219–53 + plates). [Forest Products Research Laboratory, Princes Risborough, Bucks.] L.S.

The principal fungi which cause decay in the more common species of British broadleaved trees are listed with notes on their occurrence and relative importance. The results of tests on the natural resistance to decay of various British hardwoods are tabulated. The principal diagnostic features of the more important fungi which attack Ash, Beech, Elm and Willow, and fallen hardwoods generally, are given in a series of tables. Detailed descriptions of the undermentioned fungi, of their appearance in culture and physiological characteristics are given, together with notes on the rots which they bring about, and any available information about their economic importance:—*Armillaria mucida, Daldinia concentrica, Fomes fomentarius, F. ulmarius, Ganoderma applanatum, Pleurotus ostreatus, Polyporus betulinus, P. cuticularis, P. giganteus, P. hispidus, P. radiatus, P. squamosus, Polystictus versicolor, Poria obliqua, Stereum purpureum* and *Ustulina vulgare. Authors' summary.*

44.3 (74–5) : 24 : 12.21. HEPTING, G. H. **Eastern forest tree diseases in relation to stand improvement.** *For. Publ. civ. Conserv. Corps* No. 2, 1941. pp. iii + 26. [Bureau of Plant Industry, U.S.D.A.]

A description of the more common and important forest tree diseases of the Eastern States in relation to stand-improvement operations. Notes are given on the distinguishing characteristics and measures for the control of native heart-rot, bark and plantation diseases, and on a few threatening diseases introduced from abroad.

44.3 : 11.47 : 23.27. THOMPSON, A. R. **The soil factor in diagnosis.** *Trees, Sta. Monica, Calif.* 5 (4), 1942 (10).

A general account of the importance of the soil factor in the diagnosis of tree diseases of environmental or non-parasitic origin.

44.3 : 12.21 (945). PARKIN, G. **Fungi associated with typical truewood decays observed in Victorian forest trees.** *Aust. For.* 6, 1942 (82–6).

Includes a tabular statement indicating the type of decay, and the name and morphological characters in culture of the fungus responsible, for 23 trees, mainly Eucalypts, on which observations were made.

44.3 : 12.21 : 12.11.11. ROBBINS, W. J., and MA, R. **Specificity of pyridoxine for *Ceratostomella ulmi*.** *Bull. Torrey bot. Cl.* 69, 1942 (342–51). O.B.D.

Experiments to determine the effect of twelve analogs of pyridoxine on the growth of *Ceratostomella ulmi* in agar culture. The possibility of investigating certain of these compounds in relation to the control of the Dutch Elm disease is briefly discussed.

44.3 : 12.21 : 13.15 : 13.2. PARKIN, E. A. **Symbiosis and siricid woodwasps.** *Ann. appl. Biol.* 29, 1942 (268–74). [Forest Products Research Laboratory, Princes Risborough, Bucks.] L.S.

It appears that a single species of fungus, *Stereum sanguinolentum*, is associated with the woodwasps *Sirex gigas* and *S. cyaneus*. This fungus is present in

the intersegmental sacs situated at the anterior end of the ovipositor of adult females. The egg becomes infected at the start of its passage down the ovipositor, and when it has been deposited in timber, mycelial growth commences and the fungus subsequently precedes the larva in its boring.

44.3 : 12.21 : 23.26.4. WISCONSIN. **What's new in farm science. Part 2: Annual report of the Director, Agricultural Experiment Station, University of Wisconsin, Madison.** *Bull. Univ. Wisconsin agric. Exp. Sta.* No. 451, 1941. pp. 112.

Investigations have shown that the two fungi *Pythium irregulare* and *Rhizoctonia solani* are virulent damping-off pathogens. Both fungi grew best in culture at 82° F. and pH of 5·9–6·5. *Pythium* caused most damage at temperatures between 54° and 70°, killing seedlings before they emerged, and at pH 6·1–8·5 (minimum damage at 4·5), and damage by this fungus increased as the soil moisture content increased from 13 to 100 per cent. of its moisture-holding capacity. *Rhizoctonia* was most destructive at temperatures between 75° and 86° (least destructive at 54°), at medium mositure conditions of 13 to 68 per cent., and at acidities greater than pH 5·2. The most effective control treatment reported for damping-off consists of dusting the seed with Barbak and applying calomel to the soil at the rate of 0·4 g. per sq. ft. (pp. 68–9).

44.3 : 12.21 : 31.22.1. THEDEN, J. Untersuchungen über die Feuchtigkeitsansprüche der wichtigsten in Gebaüden auftretenden holzzerstörenden Pilze. **[Investigations on the moisture demand of the most important wood-destroying fungi found in buildings.]** *Angew. Bot.* 23, 1941 (189–253). [G.g.] A.P.B.

Tests were made to determine the development of *Coniophora cerebella, Poria vaporaria, Merulius lacrymans domesticus, Lenzites abietina* and *Lentinus lepideus* in Pine sapwood at different moisture contents. These fungi grew at humidities slightly below 96·5 per cent. relative air humidity (which corresponded to the fibre saturation point under the conditions of the experiment), but they did not appear to destroy the wood at these humidities. *C. cerebella* proved the most resistant to droughts, its mycelium growing at 94·5 per cent. relative humidity. In order to check the growth of a well established fungus the relative humidity must be lower than that necessary to prevent infection, as some moisture is brought with the fungus and a certain amount is made available as the wood decomposes. High moisture content in the wood checks fungal growth. *M. lacrymans domesticus* and *C. cerebella* are the most sensitive to water, *P. vaporaria* less so, while the remaining two fungi can support quite well a high moisture content.

44.3 ; 12.25 : 12.26–8 : 12.21 (79.4). BONAR, L. **Studies on some California fungi. II.** *Mycologia* 34, 1942 (180–92). R.A.M. 21 (394–5).

This annotated list of 19 fungi from California includes the following new species found on forest trees. *Mycosphaerella sequoiae* on leaves and young twigs of *Sequoia sempervirens* infects the tips of the leaves and works back to the base, a high percentage of the leaves being killed and the foliage presenting a blasted appearance. *Diedickea piceae* on the leaves of *Picea sitchensis* causes yellowing and discoloration with early leaf fall. It appears on the current season's foliage in the autumn, becoming conspicuous the following summer. *Polyporus sulphureus* is reported to cause an extensive heart rot of the lower trunk and large roots of living *Eucalyptus globulus* in centra California.

44.3 : 12.25 : 12.21 : 12.14.4. CASH, E. K. **An abnormality of *Abies balsamea*.** *Plant Dis. Reptr.* 25, 1941 (548). R.A.M. 21 (355).

An abnormal condition of the twigs of *Abies balsamea* was observed on material shipped to New York from Newfoundland, and later at Buffalo on *Abies* from Nova Scotia, at Boston on *A. balsamea* from New Hampshire, and in Colorado on *A. lasiocarpa*. The apical stems bore an abundance of staminate blossom buds, the development of the terminal one frequently being arrested, with the result that branching was abnormally dense. The scales surrounding the staminate cones formed in previous years were still attached to the slightly swollen twigs, though the cones had fallen out. No fungi or other micro-organisms could be found in most of the specimens; but those from Newfoundland harboured black, depressed-globose sclerotia, surrounded by the cup-like sheaths formed by the above-mentioned basal scales. These sclerotia may possibly belong to *Sclerotinia kerneri*, described on *A. alba* in Austria by Wettstein in 1887.

44.3 : 12.25 : 12.21. CHRISTENSEN, C. M., and KAUFERT, F. H. **A blue-staining fungus inhabiting the heartwood of certain species of conifers.** *Phytopathology* 32, 1942 (735–7). [University of Minnesota.]

Isolations from the stained wood of *Thuja occidentalis* have in most cases yielded a non-sporulating, very slow-growing fungus with dark hyphae, which is chiefly or wholly responsible for the blue stain, plus one or more unidentified sporulating fungi. It was found that the mycelium is not confined to particular cells or tissues but grows through tracheids and rays much as do wood-rotting fungi. The fungus has been frequently isolated from branch stubs of Northern White Cedar and Balsam Fir and has been observed in samples of heartwood of Western Red Cedar and Port Orford Cedar.

44.3 : 12.25 : 12.21 : 11.1. HIRT, R. R. **The relation of certain meteorological factors to the infection of Eastern White Pine by the blister-rust fungus.** *Bull. N.Y. St. Coll. For.* 15 (1a), 1942. pp. 65. [*Tech. Publ.* No. 59.]

In these investigations *Ribes nigrum* was used exclusively as the source of sporidia because of its pronounced susceptibility to *Cronartium ribicola*. The minimum time required for Pine infection under optimum moisture and temperature conditions was found to be 11·5 hours, but the amount of infection increased after 19·5 hours. The optimum temperature range was approximately 50° F. to 65° F., and a constant temperature level of 68° F. to 69° F. was sufficient to inhibit Pine infection. Rain was more important than either fog or dew as the source of moisture favourable to infection of Eastern White Pine, although fog and dew also tended to produce favourable conditions. Pronounced Pine infection was restricted to relatively few periods when favourable weather happened to coincide with suitable stages in the development of the rust. The planting of Eastern White Pine on sites that are unusually favourable climatically for Pine infection should be avoided.

44.3 : 12.25 : 12.21. MARTÍNEZ, J. B. Las micosis del *Pinus insignis* en Guipúzcoa. **[Fungal diseases of *Pinus***

insignis in Guipúzcos.] *Trab. Inst. for. Invest., Madr.* 13 (23), 1942. pp. 72 + plates. [Span.f.e.g.]

Among the diseases observed and described, those causing defoliation include *Naemacyclus niveus* Sacc., *Septoria acicola* Sacc., *Diplodia acicola* Sacc., and *Lophodermium pinastri* Chev., the first species being most common, while diseases causing the destruction of wood include *Dacryomyces palmatus* Bres. and *Irpex fuscoviolaceus* Fr. Control and preventive measures are discussed.

44.3 : 12.25 : 12.21. McKENZIE, M. A. **Experimental autoecism and other biological studies of a gall-forming *Peridermium* on northern hard Pines.** *Phytopathology* 32, 1942 (785–98). [Massachusetts Agric. Exp. Sta., Amherst.]

A short review of literature dealing with autoecism of aeciospores in rusts of forest trees and some investigations on rusts in general, followed by an account of experiments resulting in the successful inoculation of *Pinus sylvestris*, *P. banksiana* and *P. rigida* with aeciospores of a gall-forming *Peridermium* from *P. banksiana* and *P. rigida*, with observations on the various responses of inoculated trees to infection. Infection was limited to the growth of the season of the inoculation, and galls were formed only on *P. sylvestris* inoculated with aeciospores from *P. banksiana*.

44.3 : 12.25 : 12.21. MILBRATH, J. A., and McWHORTER, F. P. **Cause and control of the Coryneum blight of Oriental Arborvitae.** *Bull. Ore. St. Coll. agric. Exp. Sta.* No. 382, 1940. pp. 12.

The blight is due to infection by *Coryneum berckmanii*. Tree species known to be susceptible to the disease are *Thuja orientalis* L. var. *conspicua* Berckmans and other varieties of *T. orientalis*, and *Cupressus sempervirens*. Owing to its climatic requirements the disease is unlikely to be of importance outside a very narrow zone. Directions are given for making and applying two separate sprays which are recommended for controlling the disease, one containing red copper oxide and the second basic copper sulphate.

44.3 : 12.25 : 12.21. TEHON, L. R. **Diseases of trees. Spread of White-Pine blister rust in 1941.** *Amer. Nurseryman* 76 (5), 1942 (22).

Mainly an extension of its range on *Ribes* in the eastern United States from central Virginia and West Virginia into northern Tennessee and North Carolina, and on Sugar Pine in the west into new localities in northern California and southern Oregon.

44.3 : 12.25 : 12.21 (75.4–6). PIERCE, R. G. **Spread of White Pine blister rust in southern Appalachian States in 1941.** *Plant Dis. Reptr.* 26, 1942, (54–5). R.A.M.21 (355).

During 1941 the agent of White Pine blister rust, *Cronartium ribicola*, spread from Raleigh County, West Virginia, to McDowell County, North Carolina. Three species of *Ribes* were attacked. White Pines within the newly infected zones appeared to be free of the disease and, as most of the valuable Pine stands were already protected by the initial eradication of *Ribes*, this further southward extension of the rust is of no particular importance in connexion with its control.

44.3 : 12.25 : 12.21. POMERLEAU, R. **The spherical gall rust of Jack Pine.** *Mycologia* 34, 1942 (120–2). R.A.M. 21 (395).

In addition to the two well-known types of gall rusts on Jack Pine (*Pinus banksiana*), namely, the fusiform gall caused by *Cronartium comandrae* and the effused gall of the base of the stem caused by *C. comptoniae*, a third type, a true globose gall, has been observed for several years in Quebec. Some galls of this type are considered to be related to those of *C. quercuum*, but not all, for they occur in northern regions, where Oak, the alternate host, is from 200 to 300 miles distant; others appear more closely to resemble those due to *C. coleosporioides*. The teleuto stage of the latter rust was recently collected on *Melampyrum lineare*, and previously on other hosts. Pending definite proof of the relation between the rust on *M. lineare* and the spherical gall on Jack Pine by direct inoculation, the author tentatively proposes the extension of the range of *C. coleosporioides* to eastern America and the addition of *P. banksiana* to its list of aecidial hosts.

44.3 : 12.25 : 12.21. TEHON, L. R. **Diseases of trees. Rot of *Chamaecyparis*.** *Amer. Nurseryman* 76 (3) 1942 (28).

Varieties of *Chamaecyparis lawsoniana*, *C. obtusa gracilis* and possibly other species of *Chamaecyparis*, are attacked by a soil-inhabiting fungus (*Phytophthora* sp.) which is causing serious losses. Trees into which the fungus had been implanted experimentally died in from two to six months. As measures of control it is suggested that diseased trees should be destroyed as soon as recognized, as much as possible of the root system should be removed from the soil, planting in rows on sloping ground and large continuous plantings of Cypress should be avoided, and new plants should be propagated only from selected healthy stock.

44.3 : 12.25 : 12.21. WISCONSIN. **What's new in farm science. Part 2: Annual report of the Director, Agricultural Experiment Station, University of Wisconsin, Madison.** *Bull. Univ. Wisconsin agric. Exp. Sta.* No. 451, 1941. pp. 112.

Malnutrition and mechanical injuries make trees more susceptible to the twig blight disease of Pines, caused by *Diplodia pinea*, and conditions of high humidity and wind favour the spread of this disease. It has been found that the fungus invades stem and needle tissue through resin canals, and also horizontally through medullary rays (p. 70).

44.3 : 12.26–8. **Disease of Chinese Elm.** *South. Florist and Nurseryman* 52 (23), 1942 (26). E.S.R. 87 (245).

Attention is called to an apparently new disease of witches'-broom type found in the vicinity of Oklahoma City.

44.3 : 12.26–8 : 12.21 : 13.2. BUCHANAN, W. D., and SMUCKER, S. J. **Reactivation of *Ceratostomella ulmi* in occluded infections and contamination of *Scolytus multistriatus*.** *J. econ. Ent.* 35, 1942 (178–80). R.A.M. 21 (433–4).

When *Scolytus multistriatus* adults were allowed to feed under controlled conditions on 229 Elm (*Ulmus americana*) trees with occluded infections of *Ceratostomella ulmi*, no conclusive evidence was obtained of the reactivation of the fungus through feeding injuries. The pathogen was isolated from four out of 529 insects collected while feeding in the twig crotches and trunks of the same trees, but not from those occupying any of the 230 oviposition galleries removed from uncontaminated trap logs. Three out of 234 beetles taken while feeding in the twig crotches of trees with a current infection also yielded *C. ulmi*, which was further

ecovered from three out of 15 collected from oviposi-ion galleries in course of construction in a tree having oth an occluded (one- and two-year-old) and an active nfection.

4.3 : 12.26–8 : 12.21. DAVIDSON, R. W., CAMPBELL, N. A., and WEBER, G. F. ***Ptychogaster cubensis*, a wood-decaying fungus of southern Oaks and Wax-myrtle.** *Mycologia* 34, 1942 (142–53). R.A.M. 21 (395).

A fungus, tentatively identified as *Ptychogaster ubensis* on the basis of comparison with numerous herbarium specimens, was isolated from decaying heartwood in *Quercus phellos*, *Q. nigra*, and *Q. catesbaei* and from central decay in living stems of Waxmyrtle (*Myrica cerifera*), the first-named from Louisiana and the others from Florida. The conidial stage of the fungus was collected on dead trunks of *Q. catesbaei*, *Q. nigra*, and *M. cerifera*, and at branch stubs and injuries on living trunks of *M. cerifera* and *Q. virginiana geminata*. Attempts to germinate conidia of *P. ubensis* in culture were unsuccessful.

4.3 : 12.26–8 : 12.21 : 05.3. Memoria de los trabajos realizados por la Estación de Fitopatología agricola de a Coruña. Años 1939–40. **[Report of the work carried out by the Station of Agricultural Phytopathology of La Coruña in 1939–40.]** *Publ. Estac. Fitopat. agric. Coruña* No. 14, 1941. pp. 35 + 1 map. [Span.] R.A.M. 21 (403–4).

Among the fungi isolated from a Chestnut canker was an undetermined species of *Cytospora*, which may possibly prove to be the imperfect stage of *Endothia parasitica*. Inoculation experiments gave negative results.

Full particulars are given of a cultural and morphological study on *Phytophthora cambivora*, the agent of ink disease of Chestnut. The results of isolation experiments on withered 3- and 7-year-old Chestnut trees confirmed the fact that the mycelium of *P. cambivora* penetrates the cambial zone of the stem in a tangential direction but does not enter the root until the onset of secondary decay by bacteria and saprophytes. Up to 100 per cent. of the isolation tests were successful, the incidence of positive results declining with the advancing age of the host. Experiments are in progress on the control of the fungus by the application to the stem bases of copper oxychloride or copper carbonate.

4.3 : 12.26–8 : 12.21. DEL CAÑIZO, J. **A new method of controlling ink disease of the European Chestnut.** *Int. Bull. Pl. Prot.* 16 (1), 1942 (2M–3M). R.A.M. 21 (354–5).

The ink disease (*Phytophthora cambivora*) has caused severe loss in the valuable Chestnut stands of Spain during the past 25 years. Experiments carried out since 1934 to control the pathogen by the application to the underground portion of the trunk and root base of an insoluble copper salt (usually the carbonate), previously mixed with an adhesive liquid, have proved so successful that the method was extended by the Department of Agriculture in 1941 to a large number of groves comprising thousands of trees.

4.3 : 12.26–8 : 12.21. URQUIJO LANDALUZE, P. Nuevo metodo de lucha contra la 'tinta' del Castaño. **[A new method of control of the ink disease of Chestnut.]** *Bol. Pat. veg. Ent. agric., Madr.* 10, 1941 (15–32). R.A.M. 21 (434).

The essential features of the method, now practised on a wide scale in Spain, have been noted in the preceding abstract.

44.3 : 12.26–8 : 12.21. HOWARD, F. L. **The bleeding canker disease of hardwoods and possibilities of control.** *Repr.* from *Proc. 8th Western Shade Tree Conf.* 1941. pp. 10. [Rhode Island Agric. Exp. Sta.] I.M.I.

More detailed account of the investigations noted in *For. Abs.* 4 (56).

44.3 : 12.26–8 : 12.21. RHODE ISLAND. **Fifty-third annual report Rhode Island State College Agricultural Experiment Station.** *Contr. Rhode Isl. St. Coll. agric. Exp. Sta.* No. 586, 1941. pp. 71. A.P.B.

The bleeding canker of hardwood trees, *Phytophthora cactorum*, has been found to occur in all the New England States, Long Island, and the lower Hudson Valley of New York and New Jersey. Known suspects other than Maples include the American, European and cut-leaf form of Beech, Black Birch (*Betula lenta*), Red Oak and American Elm. It is reported that a solution of 'helione orange' injected into a diseased tree will inhibit the growth of *P. cactorum* and inactivate a toxic substance formed by the fungus (pp. 43–4). [Cf. preceding abstract.]

44.3 : 12.26–8 : 12.14.6 : 12.21. MILLER, P. A. ***Phytophthora* crown rot of Loquat.** *Phytopathology* 32, 1942 (404–9). [University of California.] O.B.D.

Crown rot of the Loquat tree (*Eriobotrya japonica* Lindl.) due to natural infection by *Phytophthora cactorum* is described and reported for the first time in California. Suggestions are made for control of the disease.

44.3 : 12.26–8 : 12.21. LEACH, J. G., and RUPERT, J. A. **Black canker of Willow in West Virginia.** *Plant Dis. Reptr.* 25, 1941 (588). R.A.M. 21 (355).

Black canker (*Physalospora miyabeana*) has been found on two weeping Willows (*Salix babylonica*) in Tucker County, West Virginia. It is believed to be the first record of the disease from this State.

44.3 : 12.26–8 : 12.21. KONING, H. C. Verslag over het onderzoek naar den Populierenhanker over 1939. **[Report on investigations on canker in Poplars in 1939.]** *Tijdschrift der Nederl. Heidemaatschappij* No. 9, 1940 (326). [Du.]. *Abstr.* in *Forstarchiv* 18, 1942 (151–2). [G.]

A report on further investigations in Holland on the susceptibility of Poplars to canker. In inoculation tests with bacterial canker (roher Bakterienschleim) obtained from infected *P. brabantica* Houtz., *P. serotina erecta* Henry (Raverdeau form) proved resistant under the site conditions of the investigation. Investigations on the combined effects of *Nectria coccinea* and *Pseudomonas rimaefaciens* showed good resistance in *P. robusta*.

44.3 : 12.26–8 : 12.21. TAYLOR, R. L., and CHESTNUT, A. F. **A perennial woody gall on Hickory.** *Abstr.* in *Proc. Va. Acad. Sci.* 1, 1940 (206). C.G.B.

A perennial growth on *Carya cordiformis* (Wang.) K. Koch, which is increasing in the vicinity of Williamsburg, Va., may be caused by *Pseudomonas tumefaciens* or *Phomopsis* sp. It has not so far been observed by the authors on other Hickories.

44.3 : 12.26–8 : 12.21. ZENTMYER, G. A. **Toxin formation by *Ceratostomella ulmi*.** *Science* (*n.s.*) 95, 1942 (512–3). [Connecticut Agric. Exp. Sta.] L.S.

Experiments have shown that *C. ulmi* in culture produced a soluble toxic substance, which, when freed of the fungus and injected as a sterile filtrate into healthy Elm seedlings, produced typical symptoms of the Dutch Elm disease. Injection of 75 c.c. of the filtrate into nursery-grown Elms, 3 to 4 ft. tall, caused some 20 per cent. of the leaves to be killed and wood discoloration to extend 24 in. above the injection hole. [Cf. *For. Abs.* 4 (57).]

45. DAMAGE BY ANIMALS

45.1. *Mammals*

45.12 : 12.25 : 22.89. DEERWESTER, T. **Cooperative snowshoe hare control project.** *Wis. Conserv. Bull.* 6 (4), 1941 (19–20).

The snowshoe hare population varies regularly from a very high density to almost complete extinction. During the peak period it is necessary to protect new coniferous plantations by snaring, trapping or hunting the hares, or by the use of repellents on the trees themselves. This last method, although effective, is impracticable, as re-spraying would be necessary after one year, while the effectiveness of trapping depends on weather conditions and on the abundance of food in the area.

45.12 : 13.2 : 23.24. DAVIS, D. H. S. **Rodent damage in plantations and its prevention.** *J. S. Afr. For. Ass.* No. 8, 1942 (64–9 + plates).

Grass-living field rodents, especially vlei rats (*Otomys irroratus*) and striped mice (*Rhabdomys pumilio*) have recently caused increasing damage in tree plantations on grass-veld in South Africa. The vlei rat appears to be responsible for the greatest damage, but both rodents ring-bark the stems and branches of young trees and gnaw the lateral branches, sometimes to a height of 3 feet or more. Although poisoning and trapping are successful to a limited extent, they are too expensive for use in large plantations. The best and most certain protective measure is the removal of the grass cover. Burning temporarily renders the area unfit for rodent colonization, and ploughing and harrowing prevent the grass from developing into a dense cover. In any case the rodents are usually forced to leave the plantations within 5 or 7 years owing to the suppression of the grass by the tree canopy.

45.3. *Insects*

45.3 (47.2–6) : 45.1–2. GUSEV, V. I., and RIMSKI-KORSAKOV, M. N. **Manual for the identification of injuries to forest and park trees as well as shrubs in the European part of the U.S.S.R.** Goslestekhizdat, Leningrad. 1940. pp. 587. [R.]

A reference work prepared primarily for the use of forestry students in the U.S.S.R. The information on insect and other animal damage is presented separately for each tree and shrub species.

45.3 (71.4) : 81. DAVIAULT, L. L'organisation et les travaux du laboratoire d'entomologie forestière de Berthierville. **[The organization and work of the laboratory of forest entomology at Berthierville.]** *La Forêt Québecoise* 4, 1942 (387–406). [F.]

45.3 (75.2) : 23.27 : 13.2. CORY, E. N. **The outstanding insects of shade trees in Maryland in 1941.** *Proc. nat. Shade Tree Conf.* 17, 1941 (108–9). [University of Maryland.]

A short description of the insects and suggestions for their control. The insects mentioned are the Locust hispa (*Chalepus dorsalis*), the evergreen bagworm (*Thyridopteryx ephemeraeformis*), mites on Oak (*Paratetranychus ununiguis*), an Oak gall (*Neuroterus niger*), the Japanese beetle (*Popillia japonica*), and the fall webworm (*Hyphantria cunea*).

45.3 (79.2) : 13.2 : 12.25. KNOWLTON, G. F. **Aphids from Mount Timpanogos, Utah.** *Great Basin Nat.* 3 (1) 1942 (5–8). R.A.E. A30 (504).

Includes 3 new species, one of which, *Cinara osborni* was taken on *Pseudotsuga taxifolia*.

45.3 : 12.25 : 13.2. BALCH, R. E. **On the estimation of forest insect damage, with particular reference to *Dendroctonus piceaperda* Hopk.**—With comments by S. A. Graham. *J. For.* 40, 1942 (621–9). [Dominion Entomological Laboratory, Fredericton, N.B.]

Reply to a recent article by A. R. Gobeil [cf. *For. Abs.* 3 (252–3)]. Studies on the Cascapedia and Ste Anne watersheds in the Gaspé Peninsula, Quebec show that simultaneous outbreaks of the eastern Spruce bark beetle (*D. piceaperda*) and European Spruce sawfly (*Gilpinia hercyniae*) have resulted in the destruction of a great part of the volume of the most stable (uneven-aged Spruce/Fir) type, which produces the highest yield per acre on the most accessible sites. It is pointed out that the effect of such outbreaks cannot be indicated by a simple calculation of the volume of dead wood. Thus, (*a*) where the White Spruce content of the stand has been high, its destruction by the insects will result in severe mortality of Balsam Fir from exposure; (*b*) insect damage has changed a relatively fire-resistant type to one with a high fire hazard; (*c*) reduction in stand density and the fact that fallen trees constitute a serious obstacle to cutting will increase the cost of operating in affected areas for many years to come, in fact it is doubtful if the stand will be fully replaced within seventy years.

The Spruce bark beetle, when epidemic, does not confine its attack to overmature stands or trees, and is capable of causing the destruction of a large part of the merchantable volume of valuable Spruce forests and an undesirable change in the composition of the stand.

The management of Spruce forests on a rotation of one hundred years or less would eliminate serious outbreaks of the beetle, but this would not affect the depletion of older stands upon which the pulp and paper industry relies for part of its future supply of wood. The calculation of a surplus of Spruce by comparing the total volume in a region with the past annual cut gives a false idea of the problems of forest use and protection. *In part from author's summary.*

45.3 : 12.25 : 13.2 : 21.11 : 23.1. BEAL, J. A. **Mortality of reproduction defoliated by the red-headed Pine sawfly (*Neodiprion lecontei* Fitch).** *J. For.* 40, 1942 (562–3). [Duke University.]

From the observations recorded it appears that open-grown Shortleaf and Loblolly Pines are less subject to attack by the red-headed Pine sawfly than are those growing under shade, and, if attacked, are able to withstand more severe defoliation than are shaded trees. While open-grown trees can survive losses of up to 76 per cent. of their foliage, shaded trees will die after as little as 50 per cent. defoliation by this insect.

45.3 : 12.25 : 13.2. HAMILTON, C. C. **Control of the Pine sawfly, *Neodiprion sertifer* Geoff. with concentrated lead arsenate sprays.**—With discussion. *Proc.*

nat. Shade Tree Conf. 17, 1941 (110–18). [New Jersey Agric. Exp. Sta.]

Includes a description and life history of the insect, which threatens to become a serious pest in Pine forests of New Jersey, and has also been reported elsewhere. It can be economically controlled in wooded areas by a spray made of 48 lb. Sherwin-Williams dry dispersed arsenate of lead, 300 gal. water, one gal. Sherwin-Williams Spralastic, one pt. Grasselli Spreader and Sticker, applied with a Bean sprayer having a capacity of 35 gal. per minute and 700 lb. pressure at the pump. The spray was directed up into the air between the trees and drifted down through the foliage.

45.3 : 12.25 : 13.2. HARRAR, J. G., and ELLIS, R. P. **The biology of a species of *Beauveria* from the Southern Pine bark beetle.** *Abstr.* in *Proc. Va. Acad. Sci.* 1, 1940 (211). C.G.B.

The pathogenicity of a species of *Beauveria* obtained in pure culture was demonstrated, and an attempt made to estimate its potentialities as a biological control of the Southern Pine bark beetle.

45.3 : 12.25 : 13.2. HARRAR, J. G., and MARTLAND, J. G. **The etiology of the *Beauveria* disease of *Dendroctonus frontalis*.** *Abstr.* in *Proc. Va. Acad. Sci.* 1, 1940 (211). C.G.B.

Experiments with isolates of a species of *Beauveria* from the Southern Pine bark beetle show that it has a wide range of hosts. The action of the disease within the host is described.

45.3 : 12.25 : 13.2 : 23.26. JOHNSTON, H. R., and EATON, C. B. **Tests with various chemicals for the control of white grubs in forest nurseries of the Carolinas.** *J. For.* 40, 1942 (712–21). [Bureau of Entomology and Plant Quarantine, U.S.D.A.]

Of the various materials used in the tests described, undiluted carbon disulphide, injected into holes 3 to 4 in. deep, spaced 6 in. apart, at the rate of 1 pint per 100 sq. ft. (1·2 cc. per hole), gave best results. Factors affecting the success of this treatment, in relation both to grub mortality and damage to seedlings, are noted.

45.3 : 12.25 : 13.2. MCKENZIE, H. L. ***Matsucoccus bisetosus* Morrison, a potential enemy of California Pines.** *J. econ. Ent.* 34, 1941 (783–5). R.A.E. A30 (434).

This insect appears to be the most important of the Coccids of this genus that seem to be injurious to Pines in California. It attacks the twigs, branches and trunks of *Pinus ponderosa* and *P. jeffreyi* of all ages, apparently causing the bark to become cracked and rough; on mature trees its attack on the trunk is limited principally to the upper crown. Infestations seem to be rather general throughout the Pine stands of California and Oregon, and preliminary observations indicate that this species may be one of the important factors in the decadence of mature forests of *P. ponderosa* and *P. jeffreyi*.

45.3 : 12.25 : 13.2 : 24.3. SALMAN, K. A., and BONGBERG, J. W. **Logging high-risk trees to control insects in the Pine stands of northeastern California.** *J. For.* 40, 1942 (533–9). [Bureau of Entomology & Plant Quarantine, U.S.D.A.]

The preliminary results of field investigations reported in this paper indicate that the removal of high-risk trees in light sanitation cuts is a promising method of forest-insect control in the Pine stands of northeastern California. Gradations in the development of characteristic symptoms of high-risk trees were segregated into four classes representing degrees of risk to be used as a basis of tree selection in the field. In practice the risk ratings were applied to each tree in a sample of 18,056 trees. Subsequent cruises over a 3-year period have shown that over 84 per cent. of the losses occurred in trees of high-risk rating which constituted 11·1 per cent. of the total sample.

Removal of high-risk trees from green stands has thus far reduced subsequent infestations and volume of loss by an estimated 90·6 per cent. for the first year, 82·0 per cent. for 2 years, and 71·9 per cent. for the 3-year period following the cutting.

45.3 : 12.25 : 13.2. TAL'MAN, P. N. **The importance of *Xyloclytus altaicus* Gebl. from the forestry viewpoint.** *Lesnoe Khozyaystvo, Moscow* 1940 (7), (61–4). [R.]

The author reports serious damage over large areas in *Larix daurica* forests. Following persistent defoliation by *Dendrolimus sibiricus* Tschtv. over vast forest regions in the Ural and in Siberia, *X. altaicus* attacked at first only the weakened, but subsequently also the healthy, trees. Sanitary fellings in selected areas are recommended.

45.3 : 12.26–8 : 13.2 : 13.19. D'ARAUJO E SILVA, A. G., and ALMEIDA, D. G. DE. Entomologia florestal. [**Forest entomology.**] *Publ. Ministério da Agricultura, Rio de Janeiro.* No. 16, 1941. pp. 100 + plates. [Port.]

Short monographs and observations on the biology of Cerambycidae, Curculionidae, Buprestidae, and Lamiidae, thirteen in all, that are commonly found on nine important Brazilian forest trees. Notes on control measures and descriptions of the host trees are included.

45.3 : 12.26–8 : 13.2. DENNING, J. A. **Field notes on the life history of *Parlatoria chinensis* Marlatt.** *Proc. Mo. Acad. Sci.* 7 (4), 1942 (103). R.A.E. A30 (426).

Parlatoria chinensis, Marl., which had not previously been recorded from the United States, was found in Missouri in 1940 on plants of about 35 genera, including *Pyrus*, *Prunus* and *Hibiscus*. Their peak of activity occurred about 19th August.

45.3 : 12.26–8 : 13.2. FLUITER, H. J. DE. Waarnemingen omtrent engerlingen (oerets) en hun bestrijding in *Hevea*-aan-plantingen. [**Observations on white grubs and their control in *Hevea* plantations.**] *Arch. Rubbercult.* 25 (2), 1941 (167–264 + plates, gph. & map). [Du.e.] [Also as *Meded. besoek. Proefst.*, Djember.] R.A.E. A30 (417).

45.3 : 12.26–8 : 13.2. HAMILTON, C. C. **The Sycamore plant bug.** *Arborist's News* 6, 1941 (81–2 + figs.) E.S.R. 87 (397).

Control of *Plagiognathus albatus* Van Duzee, which attacks the fully grown leaves in the spring, may be obtained by spraying with 40 per cent. nicotine sulphate, diluted 1 part to 600 parts of water plus sufficient soap to make 0·25 per cent. actual soap in the diluted spray. Other wetting agents are also satisfactory. The first spray should be applied between the first and the middle of May. A second spray about 10 days later may be necessary. Particular care should be taken to wet the lower surfaces of the leaves.

45.3 : 12.26–8 : 13.2. HARDY, D. E. **A note on leafhopper abundance.** *J. Kans. ent. Soc.* 15 (1), 1942 (34). R.A.E. A30 (491).

Amblycephalus (*Cicadella*) *confluens*, Uhl., occurred in large numbers in a town in Washington in October–

November, 1941. It is said to feed exclusively on Willow, and it is suggested that Willow trees lining a stream that runs through the town are the source of the infestation.

45.3 : 12.26–8 : 13.2. HIXSON, E. **The Walnut *Datana*.** *Bull. Okla. agric. Exp. Sta.* No. 246, 1941. pp. 29 + figs. R.A.E. A30 (427).

The first recorded outbreak of *Datana integerrima*, G. & R., in Oklahoma occurred in 1935–37, when it caused serious damage to Black Walnut and Pecan trees and was also present on Hickory. An account is given of the results of studies on the life history and control of this defoliator during that period, and all stages are described. Egg parasites and predators caused considerable reductions in population while larval parasites were largely ineffective. It is concluded that the best method of control depends on such factors as type of grove and cost of labour, but that the lead-arsenate spray is the most effective and is improved by the addition of fish oil (0·5 pint per 100 gal.).

45.3 : 12.26–8 : 13.2. LEPAGE, H. S. Uma praga de diversas plantas de arborização na capital (*Ceroplastes grandis*). [**C. *grandis*, a pest of various ornamental trees in São Paulo.**] *Biologico* 7, 1941 (343–6 + plate). R.A.E. A30 (392).

C. grandis infests *Jacaranda* and *Platanus* in avenues and parks in the city of São Paulo. All stages of this Coccid are described, and its distribution and food plants in Brazil are given. Control measures recommended are pruning, scraping, and 2–3 applications at weekly intervals in January and February of a spray containing 2 per cent. of an emulsion of soap, mineral oil and water (1:4:2).

45.3 : 12.29 : 13.2. FISHER, R. C. **Insect attack in Japanese Bamboo poles.** *Emp. For. J.* 21, 1942 (48). [Forest Products Research Laboratory, Princes Risborough, Bucks.]

Living beetles, pupae and larvae of the Bostrychid *Dinoderus japonicus* were recorded on cultivated Bamboos (*Phyllostachys reticulata*) shipped from Kobe, Japan, and living larvae of the Cerambycid *Chlorophorus annularis* on other Japanese poles. All such borers may be destroyed by heat sterilization of the Bamboo in a kiln, the most suitable combination of temperature and humidity depending on the moisture content of the poles, and the length of treatment on the thickness of the walls of the culms and the way they are packed in the kiln.

45.3 : 13.2. CROSS, J. C. **A simple method of controlling termites.** *Science, N.Y.* 95, 1942 (433). L.S.

Crankcase oil poured into small ditches around the concrete supporting foundation, base of the chimney and concrete steps of a house protected it against invasion by termites from the surrounding soil which was heavily infested.

45.3 : 13.2. NIKLAS, O.-F. Schmarotzer und Nonne in der Rominter Heide 1933–1937. [**A parasite and the nun moth in the Rominter Heide 1933–1937.**] *Thar. forstl. Jb.* 93, 1942 (235–52). [G.]

A summary of observations in the Rominter Heide Spruce forest in East Prussia during the recent *Lymantria monacha* outbreak (peak year, 1935) with special reference to the effects of parasites, notably *Parasetigena segregata*. This parasite was effective mainly in stands with a low nun-moth population, while high nun-moth mortality in other stands resulted chiefly from over-population.

45.3 : 13.2 PORTNÝKH, YU. P. **Results of the first trial dusting with pyrethrum of a forest infected with *Dendrolimus pini*.** *Lesnoe Khozyaystvo, Moscow* 1940 (7), (65–9). [R.]

Satisfactory results are reported from a field test in which severely infested stands were dusted from the air, and suggestions are made for future control work.

45.3 : 13.2. VOSKRESENSKAYA, A. K. **Physiologic studies of the use of stomach poisons in the control of May beetles.** *Bull. Plant Prot.* No. 1, 1941 (71–5). [R.] R.A.E. A30 (378).

From the laboratory experiments described it is concluded that the adults of *Melolontha hippocastani* have no specific resistance to stomach insecticides, but that the value of arsenicals may be lessened by their repellancy, so that better results are to be expected from sodium and other fluosilicates.

45.3 : 44.3 : 12.25 : 12.26–8 (77.6). HODSON, A. C., and CHRISTENSEN, C. M. **Minnesota forest insect and disease survey for 1941.** *Pap. Minn. agric. Exp. Sta.* (*Sci. J. Ser.*) No. 1997, [1942?] pp. 12. [University of Minnesota.]

Insects that were particularly active in 1941 included the Pine variety of *Cacoecia fumiferana* and the Pine sawfly (*Diprion simile*) on conifers, and the Birch sawfly (*Arge pectoralis*), the Birch leaf skeletonizer (*Bucculatrix canadensisella*), the fall webworm (*Hyphantria cunea*) and the cankerworms (*Alsophila pometaria* and *Paleacrita vernata*) on deciduous trees. The eastern Larch beetle (*Dendroctonus simplex*) was found to be killing healthy, slow-growing Larch in some localities. A severe epidemic of Spruce leaf rust (*Chrysomyxa cassandrae*) occurred on Black and Colorado Blue Spruce throughout the northern region of Minnesota, and a heavy infection of Aspen leaf blight (*Fusicladium tremulae*) was observed in several areas.

5. MENSURATION. INCREMENT. YIELD

5 : 02. BRUCE, D., and SCHUMACHER, F. X. **Forest mensuration.** McGraw-Hill Book Company, Inc., New York & London. 2nd ed., 1942. pp. xiv + 425.

The principal alterations and additions in this edition are the rewriting of the chapter on sampling, the addition of a chapter on timber cruising, part of which appeared as an appendix to the third impression of the 1st edition (but to which a description of a simple method of making a local volume table has been added), and the addition of a chapter on estimates based on four variables, including taper tables and assessments of quality as well as quantity.

The main plan of the book has been maintained, with a short section on field practice, two lengthy sections on the analysis of data both for simple sampling and estimation based on correlation, including pertinent statistical theory and mathematical and graphical techniques, and lastly a short but clear outline of the problems of growth measurement.

The revised chapter on sampling includes a clear

description of the modern technique of representative, or stratified random, sampling and a good discussion of the methods and theory of sampling in which, however, too much weight is laid on the theoretical arguments against the application of statistical analysis to systematic sampling. The chapter on timber cruising largely deals with American conditions which differ profoundly from those in Britain and in most of the British Colonies in the fundamental plan of the land survey and in the timber volume units employed, and therefore can only be studied by British foresters as an example of the application of principles to practice and not as a possible technique. The difference of the fundamental units also very largely confirms the usefulness of the chapter on taper tables to American conditions, though the principles of the introduction of the fourth variable, taper, and the importance and fundamental principles of assessment of quality are universal.

In revision also the opportunity has been taken to make minor corrections and additions to the text, one noted being a restatement of the fundamental formula for the standard deviation to bring it in line with the statistical theory of variance, now most commonly followed by biometricians, so that the student coming to this further study through forest mensuration will not have to alter his first conception of this important function. On the whole, however, very few other alterations were noted, which, considering the work continuously carried out on this subject, shows how well to the fore the authors were in their first edition seven years ago.

Foresters in the British Colonies and India will note with regret that the authors have been unable to add or improve their final chapter on the growth of all-aged (uneven-aged, selection forest) stands. A practicable, sound and reasonably quick technique for this very important mensuration problem still remains to be devised. For fundamental long-term studies we can turn to the Swiss work on this question, but this does not greatly assist in the immediate practical problem facing the colonial forester.

Certain specific papers dealing with particular problems treated in this manual are given in footnotes but the addition of a general bibliography of relevant papers would have added considerably to the value of the book.

A. F.

52. MEASUREMENT OF TREES AND TIMBER

52. DAVEY, R. **Measurement of trees.—Woodland supplement.** Forest Press, Nutley, Sussex, England. 1942. pp. 12.

The supplement aims at providing a short practical explanation of the methods advocated in 'Measurement of trees'. [Cf. *For. Abs.* 4 (61).]

52.3. *Taper*

52.3 : 12.25. STOATE, T. N. **Taper in *Pinus pinaster*.** *Aust. For.* 6, 1942 (59–66).

An account of investigations on the taper (O.B.) of trees in 10- to 15-year-old stands on the coastal sands at Ludlow in Western Australia. The taper decreased with increasing age for a given breast-height girth; in trees of the same age, it increased with breast-height girth; in trees of the same age and girth, the canopy class did not appear to influence taper; wider spacing of trees did not influence taper in trees of the same age, girth, and canopy class.

52.4. *Measurement of Volume*

52.43.2 : 01.4. **Four methods of scaling logs.** *Pulp Paper Mag. Can.* 43, 1942 (776).

A comparison is given of the values in board feet for 16-ft. logs of varying diameter at small end I.B., from 5 to 24 in., as calculated by the Doyle, Quebec, New Brunswick and Tiemann log scales respectively. The latter is not in common use but has been developed from data obtained in a research project in the United States.

52.43.3 : 12.25. CHAPMAN, G. W. **Standard volume tables for Aleppo Pine in Cyprus.** *Tech. Pamphl. For. Dep. Cyprus* No. 6, 1942. pp. 7.

52.43.3 : 12.25. CHAPMAN, G. W. **Standard volume tables, Aleppo Pine.** *Suppl.* to *Tech. Pamphl. For. Dep. Cyprus* No. 6, 1942. pp. 4.

52.43.3 : 12.25. HOWELL, J., and LEXEN, B. R. **Volume tables for *Juniperus monosperma* and *Juniperus scopulorum*.** *Regional Bull. Soil Conserv. Serv.* No. 59, 1939. pp. 4 + tbls. (*Woodland Ser.* No. 8).

52.43.4. BAUERSACHS, E. Bestandesmassenaufnahme nach dem Mittelstammverfahren des zweitkleinsten Stammabstandes. [**Estimation of the volume of the stand by means of the mean sample tree method using the second shortest distance between trees.**] *Forstwiss. Cbl.* 64, 1942 (182–6). [G.]

It is claimed that the following empirical formula gives fairly accurate results:—

$$M = 0{\cdot}85 \times \frac{F}{a^2} \times m,$$

where M is the volume of the stand, m is the volume of the mean sample tree, F is the area occupied by the stand, and a is the distance from a tree chosen at random to the tree that is its second nearest neighbour, a being determined for a fair number of trees (say 50) and the average value for a inserted in the formula.

52.43.6 : 07.7. MACON, J. W., and GEVORKIANTZ, S. R. **Estimating volume on the spot.** *J. For.* 40, 1942 (652–5). [Lake States Forest Exp. Sta.]

Description of a cumulative-volume tally form which automatically converts the stand tally into volumes per acre, in cords for trees 6–12 in. d.b.h. and in bd. ft. (International ¼-in. rule) for trees 10 in. d.b.h. and larger. The form described was designed for use on reconnaissance surveys in the Lake States but it would be adaptable to the requirements of most timber-inventory surveys.

56. INCREMENT

56 : 12.26–8 : 11.49.1 (47.2–3). MATYUK, I. S. **The growth of Poplars under the conditions prevailing in the steppe.** *Lesnoe Khozyaystvo, Moscow* 1940 (7), (41–4). [R.]

Data from plantations up to 35 years old in various chernozem districts of the European U.S.S.R. indicate good growth, notably in the early years, for a number of species. *Populus canadensis* and *P. balsamifera* grow particularly well, both in the southern and in the northern steppes. The latter species at 30 years reaches a height of about 20 m. and a diameter of 25–30 cm.

56 : 22.89 : 12.26–8. ALMEIDA, D. G. DE. Estudo comparativo de cinco talhões de 'Eucalyptus'. [**A comparative study of five stands of *Eucalyptus*.**] *Rodriguésia* 5 (14), 1941 (367–73). [Port.] A.P.B.

An account of growth studies at Gávea, Brazil, on a 21-year-old stand of each of the following species: *Eucalyptus robusta*, *E. saligna*, *E. longifolia*, *E. citriodora*, and *E. tereticornis*. Omitting trees of diameter classes containing only a few individuals, the mean tree for each species had the following d.b.h. and height: *E. robusta*, 24 cm. and 23 m.; *E. saligna*, 30 cm. and 32 m.; *E. longifolia*, 24 cm. and 21 m.; *E. citriodora*, 24 cm. and 24 m.; and *E. tereticornis*, 24 cm. and 21 m.

56.02 : 11.1. SAMPSON, A. W., and GLOCK, W. S. **Tree growth and the environmental complex: a critique of 'ring' growth studies with suggestions for future research.** *J. For.* 40, 1942 (614–20). [University of California.]

A report of a conference held at the University of California in August, 1941, presenting the view of a group of specialists on the formation and interpretation of 'tree rings'. The subjects discussed in the conference were:—identity of annual increment; environmental influences on tree growth; biometric considerations; 'dendrochronology'; suggestions for future studies.

56.02 : 11.21. SCHULMAN, E. **Variations between ring chronologies in and near the Colorado River drainage area.** *Tree-Ring Bull.* 8, 1942 (26–32).

56.02 : 12.25 (76.5) : 11.14 : 11.11. SCHULMAN, E. **Dendrochronology in Pines of Arkansas.** *Ecology* 23, 1942 (309–18). [Tree-ring Laboratory, University of Arizona, Tucson.]

Results of an investigation of tree-ring series as climatic indicators on a well-drained site on the Ouachita Mountains, Arkansas. Cross-dating between trees was found to be strongest in the late wood.

57. DEVELOPMENT AND STRUCTURE OF STANDS. YIELD

57 : 12.25. WOBST, A. Ertragsuntersuchungen an Fichtenbeständen des Riesen- und Isergebirges. **[Investigations on the yield of Spruce stands in the Riesengebirge and Isergebirge areas.]** *Thar. forstl. Jb.* 93, 1942 (395–412). [G.]

Data from a large number of sample plots in medium-aged and old stands indicate that, at least in the district investigated, the estimate of the growing stock and increment based on accepted yield tables (v. Guttenberg's of 1915 for high-mountain regions, Gerhardt's of 1921 for moderately thinned stands, and Wiedemann's 'A' table of 1936 for moderately thinned stands) may lead to errors up to 20 per cent. or even higher. It was also found that with increasing elevation above sea level both the quality class and the number of stems per unit area tended to decrease.

57 : 22.83 : 22.82. BAADER, G. Was leistet der Mischbestand? **[What is the yield of the mixed stand?]** *Allg. Forst- u. Jagdztg.* 118, 1942 (221–33). [G.]

Past methods of comparing the yield from mixed and pure stands, and the results obtained from these comparisons in Germany and Switzerland are reviewed. Although not always reliable, these results suggest that mixed stands produce greater volumes of timber than pure stands.

57.4 : 07.2. ROBERTSON, W. M. **Use of transect sample plots in the study of conditions on cut-over lands.** *Pulp Paper Mag. Can.* 43, 1942 (769–72). [Dominion Forest Service, Ottawa.]

Transect sample plots, as developed by the Dominion Forest Service, are used for the study of experimental cutting areas too large to be adequately sampled by permanent plots. The suggested width for the plot is 1 chain and the length may be 10, 20 or more chains, possibly transecting the cutting area under investigation and thus providing a sample cross-section. Each plot is sub-divided into small sections of uniform size (1 sq. chain) and separate records are kept for each section. The procedure for establishing transect plots, tallying the main stand and reproduction, recording other useful information, and compiling the recorded data are described with illustrations of the recording forms used and of diameter-height and volume curves developed from the field records.

57.9 : 12.25 (46). ECHEVERRÍA, I. Ensayo de tablas de producción del *Pinus insignis* en el norte de España. **[An attempt at yield-table construction for *Pinus insignis* in the north of Spain.** *Trab. Inst. for. Invest., Madr.* 13 (22), 1942. pp. 67 + plates. [Span.]

Preliminary yield tables for stands up to 25 years old. Five quality classes are distinguished.

6. MANAGEMENT. WORKING PLANS. SURVEYS.

60. GENERAL LAND MANAGEMENT

60 : 97.1 : 61. LYNN, G. W. **Surveys in land planning.** *Farm and Forest* 3, 1942 (21–2).

Emphasis is laid on the need for making land surveys before putting into practice theories for agricultural development.

60 (73) : 97.1 : 61.3. UNITED STATES. **Land classification in the United States. Report of the Land Committee to the National Resources Planning Board, Washington.** 1941. pp. viii + 151 + maps.

60.3. *Management of Different Classes of Forest*

60.3 (497.2) : 09.4 : 94.12. STEFANOFF, D. Forstwirtschaftliche Resultate in Bulgarien. **[Results of forest management in Bulgaria.]** *Z. Weltforstwirt.* 9, 1941–42 (294–8). [G.e.f.]

General notes on forestry in Bulgaria. In the old Bulgarian territory there are some 3·4 million ha. of forest, while the forest areas of the newly acquired territories of Southern Dobruja and of Macedonia and Thrace comprise 100,000 ha. and 900,000 ha., respectively. Communal forests account for two-thirds of the forest area of the old Bulgarian territory; since 1939 these have been under the administration of State forest officers.

60.3 : 22.88.2 : 12.26–8 (75.4) : 56. BESLEY, L. **Practical forest management for the cut-over hardwood lands in southern West Virginia.** *Bull. W. Virginia agric. Exp. Sta.* No. 300, 1941. pp. 15 + xlvi.

Report of a reconnaissance in private forests of different mixed hardwood types in Logan, McDowell, Mingo, Raleigh, and Wyoming Counties, West Virginia. The average stand is growing at a rate of 48 cu. ft. per acre per year, and in over half the area the annual growth is 54 cu. ft. per acre. If fires are kept out, it will be possible to cut 1,000 pitprops or 1,100 cu. ft. from the average acre every 20 years. The bulk of the area would respond generously to a few simple practical forestry measures which would not only increase the

growth rate but would also improve the quality of the produce. This would result in returns well in excess of investment.

60.31 : 12.19.2 (68) : 11.41.2 : 11.41.3. LAUGHTON, F. S. **Notes on the sylviculture of the indigenous forests.** *J. S. Afr. For. Ass.* No. 8, 1942 (24–36 + plate).

A classification is presented of the indigenous forests of South Africa based on the two principal factors that control their distribution and development—soil moisture and soil aeration, and suggestions are made for the management of each type.

60.31.2 : 43.1 : 23.2 : 3. HEACOX, E. F. **The place of forestry in the Longview operation of the Weyerhaeuser Timber Company.** *W. Cst. Lumberm.* 69 (9), 1942 (48, 50).

The present programme for this operation is based on four main lines of development:—(1) fire protection; (2) formulation of long range management plans designed to perpetuate the operation at the highest possible productive level; (3) increase the standards of timber utilization; (4) prompt reforestation of cutover areas.

61. SURVEYING. MAPPING

61.3 (78.9) : 01.4. **Forest survey procedure and techniques.** *Regional Bull. Soil Conserv. Serv.* No. 70, 1940. pp. 18 + 35. (*For. Ser.* No. 11).

A bulletin prepared for the use of forestry technicians of the Soil Conservation Service.

61.32 : 62 : 07.7. KRAMER, P. R., and STURGEON, E. E. **Transect method of estimating forest area from aerial photograph index sheets.** *J. For.* 40, 1942 (693–6). [Central States Forest Exp. Sta.]

A method of transecting has been developed for estimating the extent of various land-use areas from aerial photograph index sheets. Linear measurements are made along uniformly spaced transect lines superimposed on the photographs by use of a celluloid guide. These measurements are then totalled and converted to figures for ground area. Tests have shown that the transect method is at least equal to planimetering in accuracy and about 3·5 times as rapid. *From authors' summary.*

64. DESCRIPTION OF SITE. ASSESSMENT OF SITE AND STAND QUALITY

64 : 11.48 : 11.62.1. COOPER, W. E. **Forest site determination by soil and erosion classification.** *J. For.* 40, 1942 (709–12). [Soil Conservation Service.]

The data presented show a marked similarity between site indices (height of dominant trees at 50 years) on similar soils, and a definite relation between tree growth and degree of erosion, height growth being consistently lower with increased severity of erosion. It is suggested that site classification based on soil series and intensity of erosion may have a general application and provide a simple and accurate method of determining soil productivity.

64 : 12.25 : 65.2 : 65.4 : 22.82.1. PARKER, H. A. **Dominant height and average diameter as a measure of site in untreated even-aged Lodgepole Pine stands.** *Silvic. Res. Note Dom. For. Serv.* No. 72, 1942. pp. 19 + gphs.

The height of dominant trees in even-aged stands is a better measure of site when correlated with age and density than when correlated with age only, and similarly the average diameter of the whole stand (even-aged) can be used for site determination when it is correlated with age and density. In the stands investigated it was found that the correlation between dominant height and average diameter was represented by a coefficient of approximately 0·83. Average diameter was found to be relatively more sensitive to increasing stand density than was dominant height.

64 : 57 : 11.41.7 : 11.33 : 65.7. LOCKE, S. S. **Use of soil-site factors in predicting timber yields.** *Proc. Soil Sci. Soc. Amer. 1941* 6, 1942 (399–402). [Soil Conservation Service.] H.S.B.

The three factors, physical soil characteristics, direction of slope, and the degree of stocking, if properly correlated with existing yield data in a comparable geographic area and in a specific cover type, are of use in predicting timber yield in middlewestern Oak woodland. *From author's summary.*

64 : 60 : 97.1. NASH, T. A. M. **The value of plant indicators in rural planning.** *Farm & Forest* 3, 1942 (83–6).

From local observations in north-east Zaria (northern Nigeria) it appears that the more mixed the species in savanna woodland the better the land is for farming Specifically, pure stands of *Terminalia macroptera* indicate wet-season waterlogging; 'partial pan', which can be successfully farmed, is characterized by numerous suckers and small stunted specimens of *Pseudocedrela kotschyi*, numerous *Gardenia erubescens* and *G. ternifolia* and the presence of *Tamarindus indica*; woodland of *Isoberlinia doka* and *I. dalzielis* on deep soils indicates good farmland; *Ficus gnaphalocarpa* indicates the probability of water within 20–30 ft. of the soil surface; *Boswellia dalzielii* indicates lack of water and poor farming land as it grows on rock or gravelly soil; woodland containing numerous *Butyrospermum parkii* and *Vitex cienkowskii* indicates excellent farmland; open savanna woodland on soil covered with hummocks of grass and dried worm-casts indicates land excellent for yams but unsuitable for guinea corn.

7. FOREST ECONOMICS, VALUATION, AND FINANCE

74. VALUE OF THE STAND. VALUE OF THE FOREST

74.2 : 56.05 : 56.1 : 32.1 : 12.25. HEIBERG, S. O. **Cutting based upon economic increment.** *J. For.* 40, 1942 (645–50). [New York State College of Forestry.]

Merchantable trees left by the timber marker must have an economic justification and increase in value at an acceptable rate of interest. Economic increment charts for Eastern White Pine and Hemlock on the Pack Forest in the Adirondacks, New York, are given as examples.

76. MANAGEMENT STATISTICS

76.1 : 22.14.2 : 22.11 : 24.2 : 12.25. STOTT, C. B. **Comparison of logging costs with clear-cutting and several intensities of selective thinning in northern Minnesota Jack Pine.** *J. For.* 40, 1942 (544–51). [U.S. Forest Service.]

This paper describes a detailed study of the costs

involved in clear-cutting and partial cutting (29, 38 and 61 per cent.) in a 48-year-old Jack Pine stand. The wood was sold by the State to a paper company which contracted the logging to a jobber. The area of the tract was 136 acres and the cut of wood from the 29-, 38-, 61- and 100-per-cent.-cut blocks was, respectively, 363, 366, 352 and 437 cords. The profits of the jobber were highest under the 38-per-cent. selective thinning ($1.22 per cord) and second under the 61-per-cent. thinning ($1.12 per cord). The wood from the selectively-cut area cost the paper company 26 cents per cord more than the wood from the clear-cut area, though under selective cutting the company obtained a more uniform pulpwood of higher yield per cord due to the larger sticks, and cleaner, stronger pulp. The piece cutter made less money on selective thinning at the established rates of pay per stick of wood and it is concluded that selective thinning in pulpwood stands definitely requires some adjustment of pay rates to the cutters and some modification of logging technique to conform to the reduced cut per unit area. General observations four years after the cutting indicate that the best volume increment per acre and the best general thrift resulted from the 29-per-cent. thinning.

8. ADMINISTRATION

8 (54.2) : 43.1 : 2 : 23.3 : 67 : 3 : 32.9 : 57 : 76.2 : 07. ROBERTSON, F. **Fifteen years of forest administration in the United Provinces: a short retrospect.** *Indian For.* 68, 1942 (55–64, 115–22).

8 : 90 (73). **Loyalty versus efficiency in administrative public policies: Report of Committee on Forest Policy, New England Section, Society of American Foresters.**—With comments. *J. For.* 40, 1942 (523–9).

82. LABOUR QUESTIONS

82 : 32. KEPPNER, T. **Selling safety to the logger.** *W. Cst. Lumberm.* 69 (8), 1942 (50, 71).

Suggestions for propaganda and education with a view to preventing logging accidents and improving first-aid organization.

84. BOOK-KEEPING

84. DIETERICH, V. Leitziele und Grundzüge der forstlichen Erfolgsrechnung. [**Chief aims and principles of assessing financial success in forestry.**] *Forstwiss. Cbl.* 64, 1942 (1–23). [G.]

A general discussion of the principles of book-keeping as related to the assessment of efficiency of forestry enterprises under German conditions.

9. FOREST POLICY

9 (729.7). BROOKS, R. L. **The forest policy of Trinidad and Tobago.** *Carib. For.* 3, 1942 (151–7). [E. span.]

90. GENERAL PRINCIPLES OF FOREST POLICY

90 (97) : 8. RODGER, A. **Forestry in the Colonies.** *Emp. For. J.* 21, 1942 (21–5).

This note discusses briefly the place of forestry in relation to colonial administration, with particular reference to possible reorganization after the war.

91. SOCIAL AND ECONOMIC SIGNIFICANCE OF THE FOREST

91 : 96.3 : 94. HAMMATT, R. F. **Forests and people.** *Sci. Mon., N.Y.* 54, 1942 (328–41). L.S.

An outline of the relationship between forest and man from the earliest times, and of the serious effects of destructive exploitation upon the life of the community. Emphasis is laid on the need for restrictions on the cutting of timber on private lands and on the desirability of a greater degree of public ownership and management of forest resources.

91 (97) : 94.1 : 76 : 81 : 60.31.1. BRASNETT, N. V. **Finance and the Colonial Forest Service.** *Emp. For. J.* 21, 1942 (7–11).

In general, forest conditions and land-use and other problems in the Colonies have been such that foresters have been unable to concentrate on forest exploitation for profit, but rather have had to build up the existing timber forests and to attempt as much protective forestry as possible. A White Paper recently issued by the Colonial Office has recognized that the primary role of forestry in the dependencies is to provide local assistance to rural economy.

The period of the present war is an appropriate time to review local forest policies and activities and to submit to governments programmes in accordance with the terms of the White Paper. It is suggested that the regional directors or inspectors-general of forests, proposed by recent investigators in Africa, could assist the governments of dependencies and their foresters as independent professional authorities, able to report on the utilization of funds and staff provided for forestry and on the adequacy or inadequacy of these. The function for which these regional officers were proposed was to effect co-ordination of policies over wider areas than is possible at present. To complete the co-ordination a head of the Colonial Forest Service has also been proposed. It is suggested that such an officer would be able to see that the best possible use is made of members of this service.

91.1. *Rural Preservation. Reserves. National Parks. Plant and Animal Protection*

91.1 (66.9) : 96.1. MCELDERRY, J. C. K. **A forest reservation survey in Pategi Emirate.** *Farm and Forest* 3, 1942 (23–7 + plate).

Based on the report of a survey of Pategi Emirate, this article deals briefly with land type, population, agriculture and trade, mining, forests, which include savanna and riparian woodland, and the policy of the emirate with regard to forest reservation, the proposals for which are outlined. The forest policy aims at obtaining large protective reserves and smaller production forests. As Pategi Emirate has a relatively small population it is suggested that it might contribute somewhat more than the thickly populated regions toward the reserve requirements (20 per cent. of the land area) of Ilorin Province. The specific proposals amount to an area of about 310 sq. miles, or just under 24 per cent. of the emirate.

91.1 : 34.3. **The effects of forest harvest on game production. Report of the committee on game management with reference to forestry, Society of American Foresters.** *J. For.* 40, 1942 (639–41).

91.4. *Value of the Forest in Hygiene and Recreation*

91.4 (73) : 97.1. ELLISON, L. **Trends of forest recreation in the United States.** *J. For.* 40, 1942 (630–8). [Intermountain Forest & Range Exp. Sta.]

92. FOREST LAW

92 (485). FALLENIUS, B., and JOHANSSON, F. Samling av författningar rörande skogsvården m.m. [Collection of statutes relating to forest conservation etc. (in Sweden).] Stockholm. 1941. pp. viii + 357. [Sw.]

92 (66.9). KENNEDY, J. D. **The development of forest legislation in Nigeria—an outline.** *Farm and Forest* 3, 1942 (31–34, 143–7).

92 (71.6) : 32.21 : 96.3. NOVA SCOTIA. **An act relating to the conservation of small trees.** Chapter 6, the Acts of 1942. (Passed the 28th day of March, A.D. 1942.) 1942. pp. 4.

92 (72 : 728 : 8 : 729). KOCH, W. Die Forstgesetzgebung Ibero-Amerikas. [**Forest legislation in Latin America.**] *Z. Weltforstwirt.* 9, 1941–42 (111–42). [G.e.f.] [Reichsinstitut für ausländische und koloniale Forstwirtschaft.]

A brief survey of the subject. In the colonial period the forest laws of Spain and Portugal were transferred to the New World, where they proved ill-adapted and ineffective. With the emancipation of the colonies the imported laws were abolished, while the new, now valid, laws were not formulated until the end of the last or the beginning of the present century. Colombia issued its forest law in 1919, Chile and Guatemala issued theirs in 1925, Mexico followed in 1926, San Domingo in 1934, Cuba, Haiti, and Venezuela in 1936, Bolivia and Peru in 1937, and Honduras in 1939. New forest laws are being elaborated in Argentine and Uruguay, and most of the States of Brazil have issued modern forest laws.

92 (73). UNITED STATES. **A bill to effectuate the recommendation of the Joint Congressional Committee on Forestry submitted to the Congress pursuant to S. Con. Res. 31 (52 Stat. 1452), as amended, and for other purposes.** 77th Congress, 1st Session. No. S.2043 Nov. 1941. pp. 80.

92 (73) : 97.2 : 94.4. UNITED STATES. **A bill to authorize the Secretary of Agriculture to enter into cooperative agreements or leases with farmers in order to provide for the management of their forest lands and the marketing of their forest products in accordance with proper forestry and marketing practices, and for other purposes.** 77th Congress, 1st Session. No. H.R.5666, Sept. 1941. pp. 10.

92 : 91 (77.4–5). UNITED STATES. **A bill to safeguard and protect the public interest through the creation of conditions under which the remaining uncut stands of timber of the Hemlock hardwood types in the northern parts of the States of Michigan and Wisconsin can be conserved and utilized in orderly and constructive ways which will perpetuate the economic and social potentialities of the forest resources and establish the best practicable balance between the current needs and future requirements of the people, industries, and communities of the regions in which such forest resources are situated and of the remainder of the United States, and for other purposes.** 77th Congress, 1st Session. No. S.1131, March, 1941. pp. 11.

94. FOREST OWNERSHIP

94.12 (66.9) : 97.2. PATTULLO, M. L. **The communal forest area scheme.** *Farm and Forest* 3, 1942 (112–6).

A means of ensuring future supplies of fuelwood and other forest products for the native farmer is by the establishment of Communal Forest Areas, which are more popular with the natives than the usual Government reserves. These areas, usually less than 1 sq. mile in extent, are administered and protected by village authorities and are used to supply purely local requirements. The first Communal Forest Area was established in northern Nigeria in 1938, and by 1940 there were 107 such areas totalling 53,865 acres.

94.4. 60.31.2. NEWTON, L. A. **Registration and co-operation of small forestry estates.** *Scot. For. J.* 56, 1942 (25–32).

Tentative proposals for the post-war improvement of small private woods. Their mahagement is to be undertaken on a co-operative basis with the collaboration of public authorities.

95. FOREST TAXATION

95.1 : 92 (73). MURPHY, L. S. **1941 supplement to State Forest Tax Law Digest of 1939.** Forest Taxation Inquiry, Washington, D.C. 1941. pp. 8 + tbls.

96. POLICY REGARDING PROTECTION FOREST

96.3 (75.5) : 23.13 : 12.25 : 12.19.4. GOOCH, W. L. **The relation of timber cutting to our Virginia forest types.** *Abstr.* in *Proc. Va. Acad. Sci.* 1, 1940 (208). C.G.B.

Clear-cutting of Pine forest areas has resulted in a reversion to hardwood types in some districts. Legislation has therefore been enacted requiring that in some counties a certain number of cone-bearing .Loblolly and Shortleaf Pines should be left standing for reseeding purposes.

96.3 : 94.3 : 60.31.2 : 32.21. **Public regulation of private timber cutting. Report of a Special Committee of the Wisconsin-Upper Michigan Section, Society of American Foresters, 1942.** *J. For.* 40, 1942 (675–80).

Arguments are presented for and against (1) any federal participation in the regulation of private timber cutting, (2) the three principal methods proposed for federal regulation, and (3) four methods by which the State would largely control private forest practice. In addition, suggestions concerning the scope and application of forest cutting regulations are submitted for further consideration.

97. POLICY REGARDING THE RELATION OF THE FOREST TO AGRICULTURE, PASTURE, AND INDUSTRY

97.1 (66.9) : 97.2 : 60. DUNDAS, J. **Ilorin rural planning scheme.** *Farm and Forest* 3, 1942 (132–3).

The area of some 1,250 sq. miles covered by the scheme lies on the southern edge of the savanna-woodland zone of northern Nigeria, the natural vegetation being a *Daniellia-Butyrospermum* association. The scheme aims at improving the rural economic position which is gradually deteriorating under existing methods of farming and exploitation of woodland.

97.1 (71.3) : 11.6 : 96 : 60. **Conservation and post-war rehabilitation. A report prepared by the Guelph Conference on the conservation of the natural resources of Ontario.** The Guelph Conference, 198 College Street, Toronto, Ontario. 1942. pp. 15.

The present condition of the renewable natural resources of Ontario is considered under the headings: desiccation; floods; erosion; pollution of waters; forest cover; waste lands and swamps; soil management; wild life; tourists; existing remedial measures. It is concluded that the present condition of these resources is unsatisfactory and that there is need for far-reaching measures of restoration and conservation. Suggestions are made for the necessary action to be taken.

97.1 (75–6) : 11.6 : 60. BENNETT, H. H. **Forestry in the southern conservation problem.** *Sth. Pulp Paper J.* 5 (2), 1942 (6–10, 14–7). [Soil Conservation Service.]

Results from the past misuse of land in the southern States, including soil wastage, water loss, sedimentation, etc. are discussed in this conference paper together with certain aspects of the work being undertaken by the Soil Conservation Service. This includes the classification of the land according to its capabilities. A table gives preliminary estimates of land area according to use-capability classes for ten southern States.

97.1 : 97.2 : 11.6 : 11.32 (43.1–5). SACHSSE, H. F. Walderhaltung und Aufforstungen in den Erzgebirgshochlagen. **[Forest conservation and afforestation at high altitudes in the Erzgebirge.]** *Thar. forstl. Jb.* 93, 1942 (374–95). [G.g.]

It is argued that much of the land in agricultural use in the higher elevations of the Erzgebirge is more suitable for forestry, and should be afforested. Afforestation is also desirable for hydrological reasons.

97.3 : 11.47.2 : 12.26–8. SMITH, R. M. **Some effects of Black Locusts and Black Walnuts upon the growth of grass and condition of the soil in southeastern Ohio.** *Ohio State Univ. Abst. of Doctors' Dissert.* 35, 1941 (133–40). Biol. Abs. 16 (14207).

A study was made to compare the grass and soil of pasture growing under Black Locust and Black Walnut trees with that of the adjacent open untreated pasture. More desirable grass species were consistently found under both tree species; and in most cases the total yields were higher, except in dense Black Locust groves. The protein content of grasses under Black Locusts was much higher, evidently due to nitrogen supplied by the root nodules. There was little difference in Ca or P under the trees, or in N under Walnuts compared with open pasture grasses. The observed facts are explained on the basis of the altered conditions under the trees, involving reduced light, altered moisture relations, soil enrichment by the tree leaves, altered C/N balance, biotic populations, and physical conditions of the soil. The relative importance and net effect of these factors are believed to vary depending upon other circumstances; but in poor pastures the tendency is toward pasture improvement either from Black Locusts or Black Walnuts in this particular region, provided they are spaced to prevent overlapping of branches. These tree species seem more favourable for pasture than other common species; Black Walnuts seem more favourable than Black Locusts except for their inability to fix N. Rapid leaf breakdown is a factor favouring both compared to most other trees. Shade and tree root competition are likely to limit yields under Black Locusts in good pastures, particularly where the trees are closely spaced. These limits to yield are less likely with Walnuts.

97.4 : 33.32 : 60.31. LYONS, R. W. **Forestry and pulpwood forests.** *For. Chron.* 18, 1942 (75–81). [Wm. Bonifas Lumber Co., Wisconsin.]

As the chief Canadian industry in net value of production is the pulp and paper industry, it is important that the forest resources of Canada should not be exploited as previously, but that present forests should be treated rather as a crop, not only to be harvested, but to be replaced by a future crop on the same land, similar to or better than the one preceding the cutting operation. Methods of cutting and the establishment of favourable seedbed conditions must be investigated in order that an adequate supply of pulpwood may be maintained.

98. THE TIMBER MARKET

98.1 (54.5) : 81 : 33.17 : 32.9 : 33.91. CHOPRA, R. S. **Supply of timber for the war from the Punjab.** *Indian For.* 68, 1942 (188–205).

A general account. A table showing army timber specifications is appended.

98.1 (66.4). MACGREGOR, W. D. **The forest production programme in Sierra Leone.** *Farm and Forest* 3, 1942 (116–9).

Increased use is to be made of Mangrove wood, used in combination with coal as a locomotive fuel, and of certain farm-bush species that have a high calorific value, such as *Anisophyllea laurina*, for domestic fuel. The production of poles and charcoal is to be increased, and efforts will be made to increase production of minor forest products such as fibres, kapok and wild silk. Rubber production is to be under the Forest Department. This will include wild rubber, the main producing species of which is the vine *Landolphia owariensis*.

98.1 (67.6) : 23.24. GARDNER, H. M. **Kenya forests and the war.** *Emp. For. J.* 21, 1942 (45–7).

The timber resources of Kenya are adequate to meet the ordinary peace-time requirements of the country, and include softwoods (*Podocarpus* spp. and *Juniperus procera*) as well as hardwoods. Increased war-time demands for timber, poles, sleepers, fuelwood, etc. have been met without destroying the future productivity of the forests, and planting has been continued at a rate of just over 3,000 acres per year.

98.1 (74–5) : 33.02 : 60.31 : 12.25 : 12.26–8. SPILLERS, A. R. **The pulpwood industry of the north-eastern forest region.** U.S. Department of Agriculture Forest Service —Eastern Region. [1942?] pp. 13 + gph.

Note on the pulpwood requirements of the industry (3·4 million cords in 1939) and related problems. For the time being the industry must rely for four-fifths of its wood requirements upon non-company lands in the U.S.A. and imports from Canada. Various suggestions are made for the improvement of the supply position by improved forestry practices in the northeastern forest region.

98.1 (931) : 31.0. COWIE, D. **New Zealand timber now.** *Wood* 7, 1942 (145–7).

Timber production in New Zealand has been greatly increased to meet that country's war-time needs as well as those of Australia and Great Britain. Some New Zealand timbers, including *Pinus insignis* from plantations, are displacing imported timbers well established in pre-war use in New Zealand.

98.1 (79.8) : 33.32 : 94.11. MANN, L. C. **Alaska's pulp producing possibilities.** *The Paper Industry and Paper World* 23, 1942 (1195–7, 1205). L.S.

The Tongass and Chugach National Forests, under the control of the U.S. Government, together comprise most of the land on the southern coast of Alaska and are estimated to contain some 84 billion bd. ft. of timber. The dominant species are Western Hemlock and Sitka Spruce, both of which are good pulping woods, though Sitka Spruce growing in pure stands has a greater value for other purposes. The yield from these forests if they were placed under sustained-yield management on a 80-year rotation is estimated at 1,500,000 cords of pulpwood producing 1,000,000 tons of paper per year for ever. Heavy rain in southeastern Alaska insures an adequate supply of waterpower, and it is estimated that there are sufficient resources in waterpower and timber to take care of seven large paper-making plants. The possibilities of the future development of these forests are considered with reference to transportation, labour and governmental policy.

98.1–2 (66.9) : 33.17. OLIPHANT, J. N. **The pilot sawmill.** *Farm and Forest* 3, 1942 (3–9).

In the past the principal forms of timber exploitation in use in Nigeria have been selective logging and selective sawmilling, both mainly for export, and cutting has been restricted to a narrow range of species, the individual trees of which are scattered over large areas of forest and are costly to extract. It is now proposed to develop a method of intensive sawmilling that will utilize all exploitable trees, and to create a local, as well as an overseas, demand for the secondary timbers. A pilot mill has been set up to pioneer this type of production.

Cheapness of the final product will be the factor that determines its success on the local market—hence low production cost is essential. This can be brought about by placing manufacture on a mass-production basis, by the introduction of machinery and plant of a type that can be operated by Africans with a minimum of European supervision, and by reducing logging costs. In this connexion mills will, where possible, be located near the source of timber supply and all exploitable species will be removed from the area of operation. While financial assistance from Native Authorities or the Government may be necessary in the early stages of development, it is contemplated that eventually the industry will be taken over largely by private enterprise.

98.1–3 (494). MOSER, W. Über das Schweizerische Holzsyndikat. **[On the Swiss wood syndicate.]** *Schweiz. Z. Forstw.* 93, 1942 (161–71). [G.]

The Swiss timber industry and timber trade have been organized for the duration of the war into a private corporation, the general policy of which is directed by the State. So far the activities of the corporation have consisted chiefly in regulating exports and imports of timber and timber products.

98.3 (66.9) : 98.1. OLIPHANT, J. N. **The Nigerian timber trade in war-time.** *Farm & Forest* 3, 1942 (94–7).

While Nigerian log exports overseas for 1941 were down nearly 30 per cent. (7,233 cu. tons) compared with those for 1940 and exports of sawn timber overseas also showed a slight decrease, the demand by the West African trade (domestic and Coast) for mill-sawn timber was doubled (from 13,384 to 26,719 tons) during this period. In considering the possibilities of the Nigerian timber trade after the war, it is pointed out that the West African market cannot afford expensive products of the type milled for the overseas trade and that the lowering of production costs is an important factor in relation to the development of new markets.

98.3 (73) : 98.1 : 33.4. **Forest products and reciprocal trade agreements.** United States Tariff Commission, Washington. 1940. pp. 38.

One of a series of reports on the industries that are affected by the American trade agreements programme. The report summarizes the principal tariff concessions regarding timber that have been granted by the U.S.A. to, and obtained by the U.S.A. from, foreign countries, and includes statistics for representative years since 1929 which afford a basis for estimating the effects of the reciprocal trade agreements on U.S. timber trade with foreign countries.

98.3 : 33.7 (71). VENESS, J. C. **What price fuelwood?** *For. Chron.* 18, 1942 (86–8). [Wartime Prices and Trade Board.]

The computation of ceiling prices for fuelwood in Canada is made difficult by variations in the value of the 'cord' and differences in service charges in different provinces and districts, and by the fact that quality and grades of fuelwood have never been standardized. The method of setting these prices is outlined briefly.

NOTES FROM THE DAILY AND THE NON-TECHNICAL PRESS

References: 1. *Argus*, Bucharest. 2. *Baltimore Sun*, Baltimore. 3. *Curentul*, Bucharest. 4. *Domestic Commerce*, Washington. 5. *Financial Post*, Toronto. 6. *Foreign Commerce Weekly*, Washington. 7. *Giornale d'Italia*, Rome. 8. *Journal*, Lyons. 9. *Krakauer Zeitung*, Cracow. 10. *Madrid*, Madrid. 11. *Mercurio*, Santiago and Valparaiso. 12. *Nacion*, Santiago. 13. *Prensa*, Buenos Aires. 14. *Press Releases*, Washington. 15. *Siglo*, Bogotá. 16. *Soir*, Brussels. 17. *Soviet War News*, London. 18. *Tiempo*, Bogotá. 19. *Universul*, Bucharest. 20. *Wall Street Journal*, New York. The numbers in brackets indicate the reference number and the date of publication of the newspapers and journals to which the annotations refer.

Argentine. Attention is called to the very unsatisfactory state of forestry in Argentine. While in 1915 the forest area of the country amounted to 106 million ha. (roughly 30 per cent. of the land area), it is now barely 90 million ha., the decrease being due to destructive fellings and forest fires. Many of the fires result from incendiarism, which is particularly prevalent in Patagonia. The forests are incompletely surveyed, and forest legislation is practically non-existent outside Mendoza and San Juan; such legislation as does exist in these two Provinces is inadequate. The increasing importance of the timber industry and the urgent need for controlling erosion require that greater public attention be given to forestry. It has been officially estimated that in 1939 five million ha. of land was lost to agriculture through erosion. Thus far afforestation has been undertaken on a relatively small scale only. The total of afforested areas is given as 148,560 ha., of which 113,631 ha. is in the Province of Buenos Aires (**13**; 4.7.42).

Brazil. Millions of Cashew trees grow wild in tropical America. Brazil alone could supply the United States market, provided the collection of Cashew nuts was properly organized. The Industrias Agroquímicas do Brasil is planning to develop production. This concern has a new plant at Fortaleza capable of processing about 3,000 tons of nuts annually (**6**; 3.10.42).

Canada. Owing to the critical metal shortage, aeroplane parts will be made increasingly of timber, plywood, or plastics. At present, five furniture plants are employing 1,500 men on this work, and a survey of the whole industry is under way to determine what additional plants can be converted (**5**; 15.8.42).

The lumber industry of the Maritime Provinces of Canada is utilizing all available forms of transportation to aid the war effort and to overcome shortages. Recently there has been a much greater use of sailing boats for transporting timber on rivers and bays and to eastern United States ports. Scows which were formerly operated with petrol engines have been fitted with masts and sails: they are used on hauls of 25 to 100 miles, mostly in protected waters. The tyre and petrol shortage has also caused a big demand for lumber wagons. Many of these have been reconditioned and are now replacing lorries. More horses are in use now than at any time since motorization.

Red Cedar timber, which is both light and durable, is proving satisfactory for planking lifeboats. British Columbia boat builders are making large numbers of these boats to supply the many new 10,000-ton freighters that are being built in Vancouver shipyards.

The Government of Quebec is setting up a bureau of forestry information for the purpose of helping farmers and settlers with forestry problems. The Province will be divided into districts, with a Government forest engineer in charge of each one (**6**; 26.9.42).

Chile. It is reported that the Minister of Lands (Don Pedro Poblete Vera) is backing a project for the afforestation by public agencies of a strip of land 500 km. long by 20 km. wide between Valparaiso and Concepcion. This land is unsuitable for agriculture but is thought to be eminently suitable for forestry. The afforestation of the area with Insignis Pine and other fast-growing trees is to be accomplished within a period of about 12 years, and the *P. insignis* stands are to be managed on a rotation of 12–14 years (**11**; 6.6.42 and **12**; 3.6.42).

Colombia. The exploitation of private forests has been placed under public control by a recent Government decree. In future all fellings will require the permission of the Ministry of Economy. Another decree authorizes this Ministry to make compulsory the afforestation of strips of land on the borders of rural properties and to prescribe the extent of the work and the species to be used. Furthermore, the issue of agricultural loans by public and semi-official credit agencies for periods exceeding 5 years will henceforth be conditional on the borrower using at least 5 per cent. of the money for afforestation. Only rural properties that are already sufficiently wooded will be exempt from this provision. The Government has also decided to prohibit all burning of forest land without a special permission from local authorities (**15**; 20.6.42).

Whereas before the war the growing timber and wood-products industry of Colombia depended to a large extent on imported raw materials, it now gets practically all its supplies from the ample forest resources within the country. In 1941 the industry included 62 sawmills, planing mills, and impregnation plants, and many other establishments. It is hoped that in future the forest resources of Colombia will be utilized so as to satisfy all internal requirements and to allow of considerable exports (**18**; 27.6.42).

Denmark. The rapidly expanding use of producer-gas units threatens to deplete Denmark's forests and the Government has requested motorists to mix peat with wood for fuel-gas production; in Sweden as much as 76,367 tons of peat were used for motor fuel in 1940 (**6**; 1.8.42).

France. It has been decided to plant 150,000 ha. of Pine in the Landes within the next 10 years (**8**; 4.9.42).

Germany. The first German fodder cellulose factory is to start mass production (100 tons per day) in a few weeks' time. The factory, which is situated in western Germany, has been working so far on an experimental scale. Feeding tests have given full satisfaction with bullocks, cows, and especially with horses (**16**; 11.6.42).

Great Britain. In accordance with the Government programme to use all timber a second time, where possible, the Timber Control has established about 200 reconditioning depots to handle reclaimed timber from air-raid-damaged buildings: rafters, flooring, doors and other material are being sorted and reconditioned. The retail trade is being urged not to break up packing cases but to return them to manufacturers. By such measures of economy and by means of licencing the use of timber has been reduced by about 50 per cent. (**6**; 3.10.42).

Italy. The Forestry Militia has been authorized to requisition all wooded areas whose owners were making insufficient use of them; the owners are to be compensated. This measure is said to be necessary owing to the shortage of fuel, and its object is to increase supplies of firewood and charcoal (**7**; 13.8.42).

Poland. Each of the five districts of the General Government now has a forestry department similar to those in the Reich. The personnel comprise 22 forest inspectors and a large subordinate staff. Trustworthy German firms have been permitted to take short-term leases of the forest enterprises on condition that these be handed over after the war to soldiers returning from the front (**9**; 23.7.42).

Rumania. The *Universul* (**19**; 29.6.42) gives some figures on the results so far achieved in the firewood campaign. The present annual requirements for domestic use are 450,000 truck loads; only 58,500 truck loads, or 13 per cent., had been transported by the 1st June. The needs of Bucharest alone amount to 110,000 truck loads, but only 21,000 had been delivered by the 18th June. It is too early to form a clear picture of this year's campaign, but the *Argus* (**1**; 5.7.42) reports that the consumers' demand can be met only to a small extent and that many have been refused registration by dealers. *Curentul* (**3**; 24.7.42) mentions a "grey market" that was selling firewood at about twice the official price.

Spain. The resinous products industry, declared to be of national importance in June, 1941, is now manufacturing synthetic camphor, varnishes, etc. from the 10,000 tons of turpentine oil and 35,000 tons of resin annually produced in Spain and formerly exported (**10**; 9.9.42).

United States. According to the 1940 census 30 per cent. of the heated dwellings in the country are dependent on wood. In July, residents in areas where wood is available and where coal has to be transported long distances, were officially urged to cut wood for use as fuel during the winter (**2**; 5.7.42 and 26.7.42 and **20**; 18.9.42). Wood is much used in the Pacific North-West and a shortage of firewood is threatened because of the establishment of war industries in that region. Cheap labour is no longer available to cut the wood, and the demand has increased owing to the influx of new residents. War workers are tending to migrate to the warmer districts, such as California, owing to the fuel situation. In order that sufficient labour might be attracted by higher wages, price adjustments were authorized for firewood in the States of Washington and Oregon. Nevertheless, cordwood supplies were not expected to be sufficient, and it was thought that a wider use would have to be made of timber waste, which as a rule is used only in the vicinity of sawmills. Increased prices have also been allowed in New England to provide an incentive for more extensive cutting of wood. The shortage there is said to be acute owing to scarcity of labour and the increased demand arising from lack of fuel oil (**14**; 14.8.42 and 21.9.42).

What is described as an entirely new development in lifeboat construction has resulted in the award of a contract for the production of 1,000 plywood lifeboats to Gunderson Bros., of Portland, Oregon, according to a recent announcement of the Maritime Commission. The new plywood vessels, to be built of six-ply Douglas Fir, are said to have certain advantages over metal boats. While the total cost approximates that of metal boats of a similar capacity, there will be a saving of about one ton of metal per boat. The carrying capacity of these lifeboats is 25 persons (**4**; 20.8.42).

U.S.S.R. Producer gas is becoming increasingly important to the Soviet agricultural and timber industries. The Chernyanovskaya tractor station, in the Tambov region, for example, has converted nearly all its tractors and many of its lorries to producer-gas operation. Many tractor stations use producer-gas installations for threshing. A special mobile producer unit has been built, and the threshing machine with which it is used turns out over one ton of grain per hour. In the Archangelsk region, all tractors and some of the stationary machinery used on timber operations are to be changed from liquid to solid fuel. Numerous producer-gas lorries and tractors have been in use on these operations for a number of years. Local factories are beginning to turn out producer-gas plants and spare parts (**17**; 11.9.42).

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